BRAINTEASERS

FOR THE SPECTRUM 48k

PROGRAMS TO PUZZLE AND AMUSE

Here at last is a collection of programs worthy of the title 'Brainteasers' and worthy of the computers for which they are designed. Built around a competition element you will be asked questions requiring logic, general knowledge and mathematical skills in your answers.

Only your quick powers of numeracy can save the lady on the railway track, escape with the takings from the bank, break open a safe.

Only your powers of deduction can solve the Whodunnit? Work out the wiring on the robot, catch the car thief.

All of the programs will exploit the graphic capabilities of your machine and, if you can face up to it, many of the programs will contain an IQ rating at the end of the program.

THE AUTHOR

Genevieve Ludinski is a widely experienced programmer and technical author and has her own software company specialising in educational material.

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G. LUDINSKI

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INTRODUCTION

Before you dive into this book, here are a few tips you may find useful when keying in the programs.

You may miss out all the REM statements except the first two. These statements are just to help you understand how the program works.

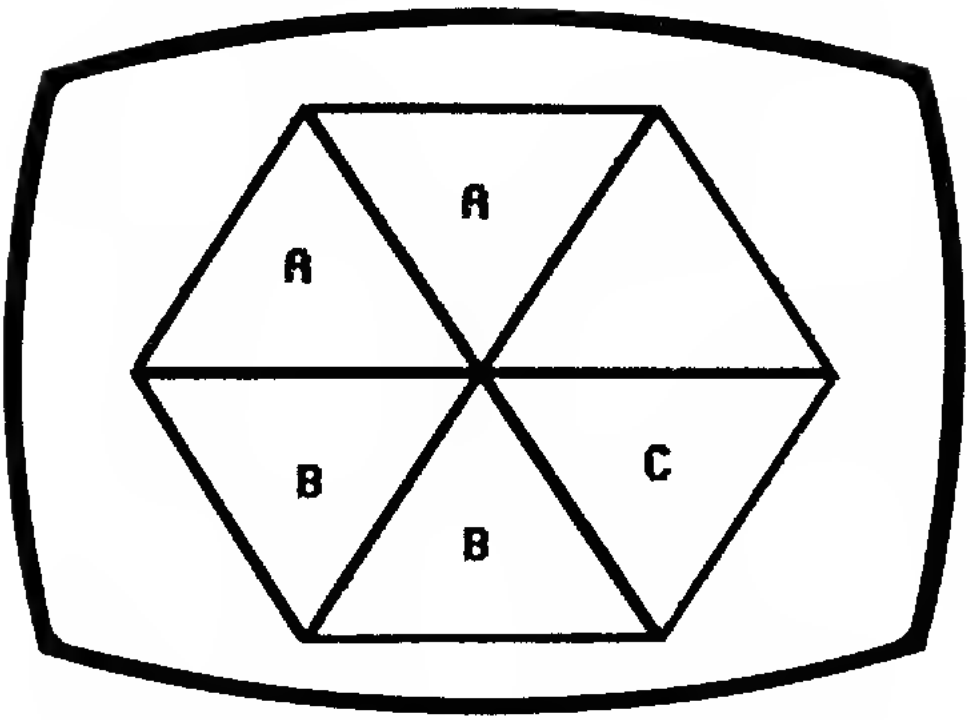
You can also omit the spaces between the line number and the start of the statement. However BASIC is rather pedantic about spaces elsewhere, so I advise you to copy the rest of the statement exactly. Also, to be safe, always put a space before words OR and AND. Any spaces within quotation marks must also be copied exactly.

Remember also to put in all punctuation exactly as it appears. If you miss out a comma, the program may not work. If the program still does not work after you have corrected the errors reported by the computer, check the following. See whether you have confused any zeros for the letter O, or alternatively ones and the letter I. Check, also, that you have not missed any program lines. This is easily done if program lines look similar. Most program line numbers go up by ten at a time, so read your line numbers to find this one.

You may find some of the procedures useful, and you are welcome to put these in any programs you write for your own use. You may not, of course, sell or give them away.

I hope you enjoy the book, and that your brain is not teased too heavily.

HEXAGON PUZZLE



You are really up against the clock on this one as you must solve as many puzzles as possible. A series of numbers, or letters, will be positioned around five of the sides of a hexagon and you will be asked to provide the missing letter or number. The relationship between the numbers or letters may be with their corresponding number or letter on the opposite side of the hexagon, or it may follow in sequence from an adjacent number.

The decision is yours.

The program will give you eleven puzzles, so see how many you can solve.

How to play

Key in the number, or letter, of your choice and press RETURN key.

Programming hints

One change to make the puzzle easier, is to reduce the size of the numbers used. S(2) on line 150 is the value of the first number in the sequence if the pattern is a sequence of numbers going around the hexagon. IC on line 160 is related to the interval between the numbers going round the hexagon. So if the 9 in line 150 is changed to a smaller number and IC is always 1 this will make the puzzle easier.

If you wish to make the puzzle more difficult (and you must be brave or a genius to want to do so), then you could either increase the possible values of S(2) or IC or increase the number of different types of sequence. At present there are five different types of sequences depending on whether W is 0 to 4. If you allow W to become 5 or larger in line 170, you could add a new sequence type for W=5 after line 230.

Program

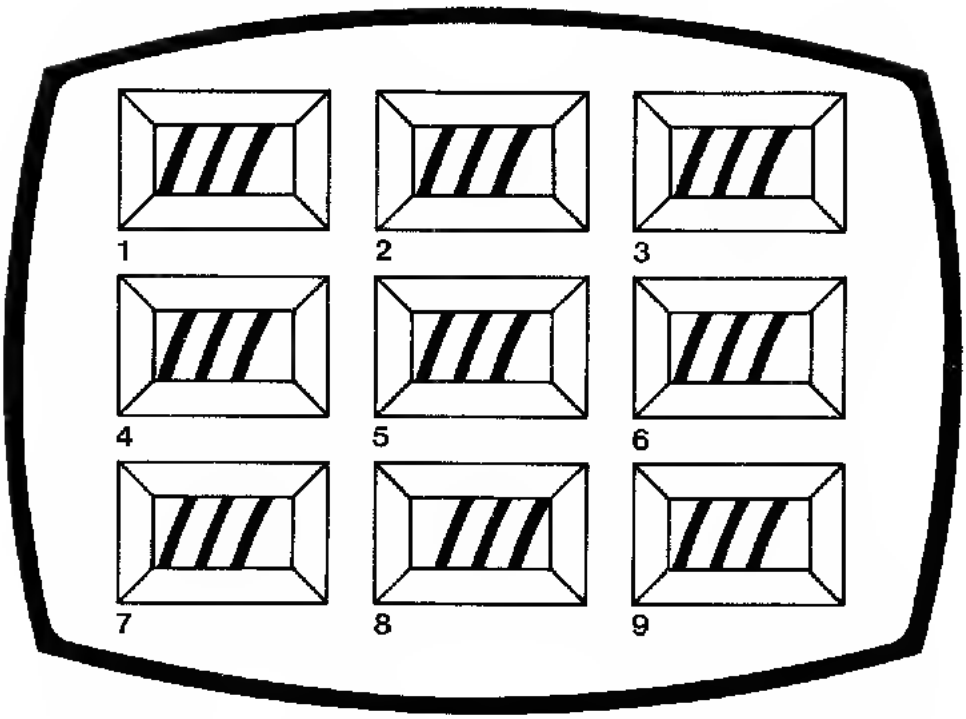
```
  1 GO SUB 800
 10 REM
 20 REM ?
 40 DIM S(8): DIM P$(255)
 50 CLS
 70 LET TE=0: LET CR=0
 80 CLS
 90 LET TE=TE+1
100 IF TE=11 THEN  GO TO 670
```

```
 110 REM
 120 REM work out sequence
 130 REM
 140 LET S(1)=0
 150 LET S(2)=INT (RND*9+1)
 160 LET ic=INT (RND*4+1)
 170 LET W=INT (RND*5)
 175 IF w=2 AND s(2)>2 THEN  GO TO 170
 180 FOR I=3 TO 8
 190 IF W=0 THEN  LET S(I)=2*S(I-1)-S(I-
2)+IC: LET M$="The interval increases by
 "+STR$ (IC)+" each time"
 200 IF W=1 THEN  LET S(I)=S(I-1)+S(I-2)
+IC: LET M$="Each number is the sum of t
he   previous two plus "+STR$ (IC)
 210 IF W=2 THEN  LET S(I)=S(2)^(I-1): L
ET M$="Each number is "+STR$ (S(2))+" to
 the power of 2,3,4,5,6 and 7"
 220 IF W=3 AND I>5  THEN  LET S(3)=S(2)
: LET S(4)=IC: LET S(5)=INT ((S(2))+IC)/
2: LET S(I)=S(2)*S(I-3): LET M$="Each nu
mber is "+STR$ (S(2))+" times the number
 opposite it."
 230 IF w=4 AND i>5 THEN  LET s(3)=s(2):
 LET s(4)=ic: LET s(5)=INT ((s(2)+ic)/2)
: LET s(i)=ic*s(11-i): LET m$="The numbe
rs on the left hand side of the wheel ar
e "+STR$ (ic)+" times the numbers on the
 right hand side"
 240 NEXT I
 250 FOR I=1 TO 13: PRINT : NEXT I
 260 REM
 270 REM display number wheel
 280 REM
 290 PLOT 135,159: DRAW 48,-18: DRAW 0,-
48: DRAW -48,-18: DRAW -48,18: DRAW 0,48
: DRAW 48,18: DRAW 0,-84: DRAW -48,18
 300 DRAW 96,47: DRAW 0,-48: DRAW -96,47
 400 REM print numbers or letters
 410 IF S(8)>26 OR s(7)>26 OR s(6)>26 TH
EN  LET LE=0: PRINT AT 4,18;S(3);AT 7,19
```

```
;S(4);AT 10,17;S(5);AT 10,14;S(6);AT 7,1
1;S(7)
 420 IF S(8)<=26 THEN  LET LE=1: PRINT A
T 4,18;CHR$ (64+INT S(3));AT 7,19;CHR$ (
64+INT S(4));AT 10,18;CHR$ (64+INT S(5))
;AT 10,14;CHR$ (64+INT S(6));AT 7,12;CHR
$ (64+INT S(7))
 430 REM
 440 REM input answers
 450 REM
 455 INPUT I$: GO TO 500
 459 STOP
 460 LET IX=1
 480 PRINT AT 4,IX+12;P$(IX);: LET IX=IX
+1
 482 LET P$(IX)=INKEY$
 483 IF INKEY$<>"" THEN  GO TO 483
 484 IF INKEY$="" THEN  GO TO 484
 485  INPUT P$(IX): PRINT AT 4,IX+12;P$(
IX): REM  PRINT AT 4,IX+12;P$(IX);: LET
IX=IX+1
 486 LET P$(IX)=INKEY$: IF P$(IX)="" THE
N  GO TO 486
 488 IF P$(IX)<>CHR$ (13) THEN  GO TO 48
0
 489 LET P$(IX)=INKEY$
 490 LET I$="0": FOR I=1 TO IX-1: LET I$
=I$+P$(I): NEXT I
 500 REM
 510 REM check answer
 520 REM
 530 REM
 535 IF LE=1 THEN  GO TO 550
 540 IF LE=0 AND VAL (I$)=S(8) THEN  INK
 2: PAPER 6: PRINT CHR$ (8): PRINT AT 19
,5;"?": LET CR=CR+1: INK 3: GO TO 610
 550 IF LE=1 AND (I$=CHR$ (64+S(8))) THE
N  PAPER 5: INK 0: PRINT CHR$ (8): PRINT
 AT 5,19; INK 2;"?": LET CR=CR+1: PAPER
3: GO TO 610
```

```
 560 PRINT AT 14,0;"No the answer = ";
 570 IF LE=0 THEN  PRINT S(8)
 580 IF LE=1 THEN  PRINT CHR$ (64+S(8))
 590 IF LE=1 THEN  PRINT : PRINT "Replac
e each letter by its       position numbe
r e.g. 1 for A, 2 for B etc."
 600 PRINT M$
 610 PRINT AT 21,0;"Press return to cont
inue"
 620 INPUT A$
 630 GO TO 80
 640 REM
 650 REM score sheet
 660 REM
 670 CLS : PRINT
 680 PRINT "Number of puzzles completed
=";TE
 690 PRINT : PRINT "Number correct =";CR
 710 LET IQ=INT (CR*100/5.3)
 720 PRINT : PRINT "Your IQ level (numer
acy)=";IQ
 730 PRINT
 740 IF CR>=7 THEN  PRINT "this is class
ed as SUPERIOR      (upper 10%)": GO TO 7
70
 750 IF CR>=6 THEN  PRINT "This is class
ed as GOOD (upper  20%)": GO TO 770
 760 IF CR=5 THEN  PRINT "This is classe
d as FAIR (upper  60%)"
 770 STOP
 800 FOR n=0 TO 7
 810 READ r: POKE USR "p"+n,r
 820 NEXT n
 830 DATA 0,0,1,2,4,136,80,32
 840 RETURN
9999 PAPER 7: BORDER 7: INK 0
```

ODD ONE OUT



Nine pictures are displayed on the screen and you are given only a few seconds to compare them and identify the odd one out.

A score sheet will be displayed, showing the number of puzzles completed, number correct and the time and average time taken.

How to play

Each of the pictures on the screen will be identified by a number, and you must key in the appropriate number as your guess.

If you get the answer wrong, you will be told the correct answer, to the accompaniment of a low pitched little tune. Get it right, however, and you will hear a pleasant little tune.

After each attempt you will be asked if you wish more (Y for Yes) or wish to stop (N for No).

Remember to press RETURN.

Programming hints

The rainbows are drawn using the PLOT and DRAW commands, except to speed up the drawing the PLOT command is replaced by a machine code routine at 32000.

If you decide to make the arcs of the rainbow thicker then increase the 2 in line 720.

Program

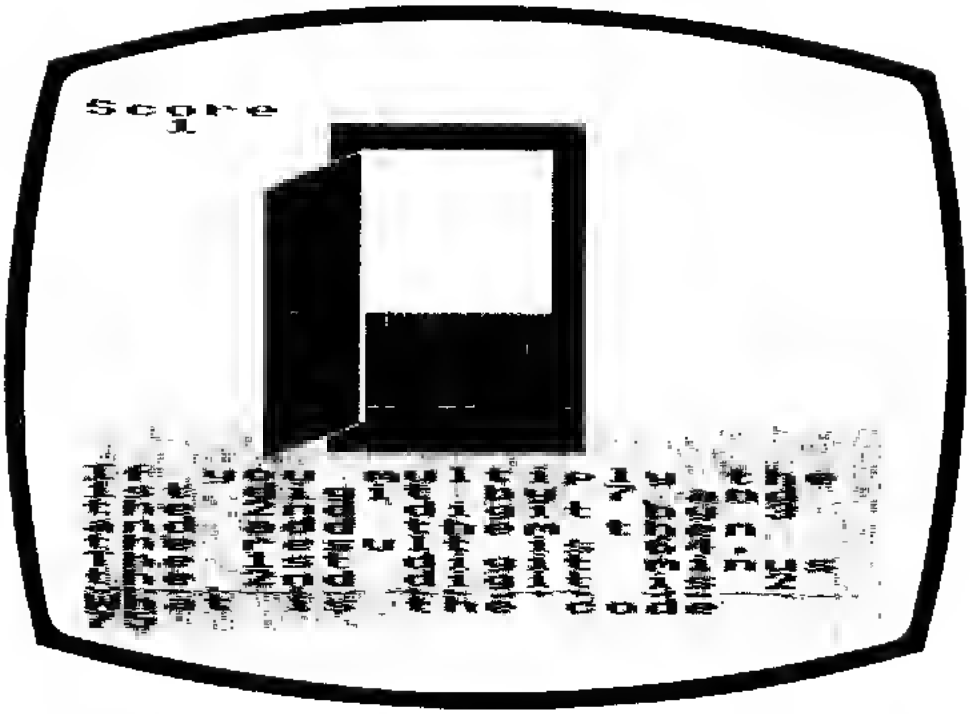
```
  10 REM odd one out
  20 REM copyright ? G.Ludinski 1983
  30 BORDER 7: PAPER 7: INK 0
  40 LET rainbow=640
  50 DEF FN u()=INT ((65536*PEEK 23674+2
56*PEEK 23673+PEEK 23672)/50)
  60 DEF FN l(m,n)=(m+n+ABS (m-n))/2
  70 DEF FN t()=FN l(FN u(),FN u())
  80 DIM a(3): DIM s(3): DIM z(3): DIM d
(9)
  90 LET nu=0: LET cr=0
 100 LET t1=FN t()
 110 GO SUB 860
 120 CLS
 130 LET nu=nu+1
```

```
 140 LET pt=0
 150 REM
 160 REM draw windows
 170 REM
 180 LET w=66: LET h=30: FOR y=140 TO 56
 STEP -42: FOR x=10 TO 255 STEP 85
 190 PLOT x,y: DRAW w,0: DRAW 0,h: DRAW
-w,0: DRAW 0,-h
 200 DRAW 5,5: DRAW w-10,0: DRAW 5,-5: D
RAW -5,5: DRAW 0,h-10: DRAW 5,5: DRAW -5
,-5: DRAW -w+10,0: DRAW -5,5: DRAW 5,-5:
 DRAW 0,-h+10
 210 NEXT x
 220 NEXT y
 230 REM
 240 REM generate rainbows
 250 REM
 260 LET wh=INT (RND*9+1)
 270 LET hi=h-10
 280 LET a(3)=-ASN (hi/(w-10)): LET a(2)
=-ASN (hi/(w-25)): LET a(1)=-ASN (hi/(w-
40))
 290 FOR i=1 TO 3: LET s(i)=1-COS a(i):
LET z(i)=hi: NEXT i
 300 REM
 310 REM draw rainbows
 320 REM
 330 LET x=15: LET y=145
 340 FOR i=1 TO 9
 350 LET d(i)=0
 360 NEXT i
 370 LET d(wh)=5
 380 GO SUB rainbow
 390 REM
 400 REM question
 410 REM
 420 INK 0: PRINT AT 16,0;"   Which wind
ow is different"
 430 LET i$="": LET i=0
 440 LET i$=INKEY$: IF i$="" AND i<50 TH
EN  LET i=i+1: GO TO 440
```

```
 450 IF i$<>"" AND (i$<STR$ 1 OR i$>STR$
 9) THEN  GO TO 440
 460 IF i$="" THEN  GO TO 480
 470 IF VAL i$=wh THEN  PRINT : PRINT "Y
es,you are right": BEEP 2,12: LET cr=cr+
1: GO TO 490
 480 PRINT : PRINT "No,";wh;" is differe
nt": BEEP 1,5: BEEP .5,4
 490 PRINT : PRINT "Do you want more (Y/
N)"
 500 INPUT r$
 510 IF r$<>"n" AND r$<>"N" THEN  GO TO
120
 520 REM
 530 REM score sheet
 540 REM
 550 CLS
 560 PRINT TAB 10;"Odd one out"
 570 FOR i=1 TO 7: PRINT : NEXT i
 580 PRINT : PRINT "Tests completed = ";
nu
 590 LET tm=FN t()-t1
 600 PRINT : PRINT "Tests correct = ";cr
 610 PRINT : PRINT "Time taken = ";tm;"
seconds"
 620 IF cr<>0 THEN  PRINT : PRINT "Time
per test = ";INT (tm/cr);" seconds"
 630 GO TO 930
 640 REM rainbow subroutine
 650 LET wi=w-10
 660 LET pt=pt+1
 670 INK 0: FOR q=5 TO 18 STEP 5: FOR k=
2 TO 32 STEP 11: PRINT AT q,k;pt: LET pt
=pt+1: NEXT k: NEXT q
 680 LET xx=x+1
 690 LET cv=0
 700 FOR g=xx+30 TO xx STEP -15
 710 LET cv=cv+1: INK cv
 720 FOR j=0 TO 2
 730 LET ra=wi+x-(g+j)
```

```
 740 POKE 32006,g+j+d(1): POKE 32007,y:
RANDOMIZE USR 32000: DRAW ra*s(cv),z(cv)
,a(cv)
 750 POKE 32006,g+j+85+d(2): POKE 32007,
y: RANDOMIZE USR 32000: DRAW ra*s(cv),z(
cv),a(cv)
 760 POKE 32006,g+j+170+d(3): POKE 32007
,y: RANDOMIZE USR 32000: DRAW ra*s(cv),z
(cv),a(cv)
 770 POKE 32006,g+j+d(4): POKE 32007,y-4
2: RANDOMIZE USR 32000: DRAW ra*s(cv),z(
cv),a(cv)
 780 POKE 32006,g+j+85+d(5): POKE 32007,
y-42: RANDOMIZE USR 32000: DRAW ra*s(cv)
,z(cv),a(cv)
 790 POKE 32006,g+j+170+d(6): POKE 32007
,y-42: RANDOMIZE USR 32000: DRAW ra*s(cv
),z(cv),a(cv)
 800 POKE 32006,g+j+d(7): POKE 32007,y-8
4: RANDOMIZE USR 32000: DRAW ra*s(cv),z(
cv),a(cv)
 810 POKE 32006,g+j+85+d(8): POKE 32007,
y-84: RANDOMIZE USR 32000: DRAW ra*s(cv)
,z(cv),a(cv)
 820 POKE 32006,g+j+170+d(9): POKE 32007
,y-84: RANDOMIZE USR 32000: DRAW ra*s(cv
),z(cv),a(cv)
 830 NEXT j
 840 NEXT g
 850 RETURN
 860 RESTORE
 870 FOR v=0 TO 11
 880 READ by
 890 POKE 32000+v,by
 900 NEXT v
 910 RETURN
 920 DATA 62,2,205,1,22,1,0,0,205,229,34
,201
 930 REM end
```

SAFECRACKER



Are you a quick-thinker or a deep thinker? I hope you are one or the other, or you will never be able to crack open someone else's safe!

This game can be played two different ways, depending on whether you are a quick or deep thinker. If you are not sure which you are, then I suggest you play it both ways, and find out which way gives you the highest score.

In all cases, a closed safe is displayed and you are given two clues about the secret code that opens it. If you work out the exact answer before keying in the code, you are given 2 minutes to do it. If you make guesses, then you are only allowed 16 seconds. Wrong answers are ignored.

If you take too long you are surprised by the caretaker who switches on the light. He then presses the alarm button and you hear the police sirens wailing and you know all is lost.

If you do manage to crack the code in time, the safe opens, revealing gold bullion.

How to play

You are given two clues such as those shown above. The code is always a two digit number. Key in the number (you need not press RETURN).

To end the program, press BREAK.

Programming hints

To reduce the number of digits allowed, reduce the number inside the RND brackets for XX and YY in line 510.

If you find the game too easy then do the opposite.

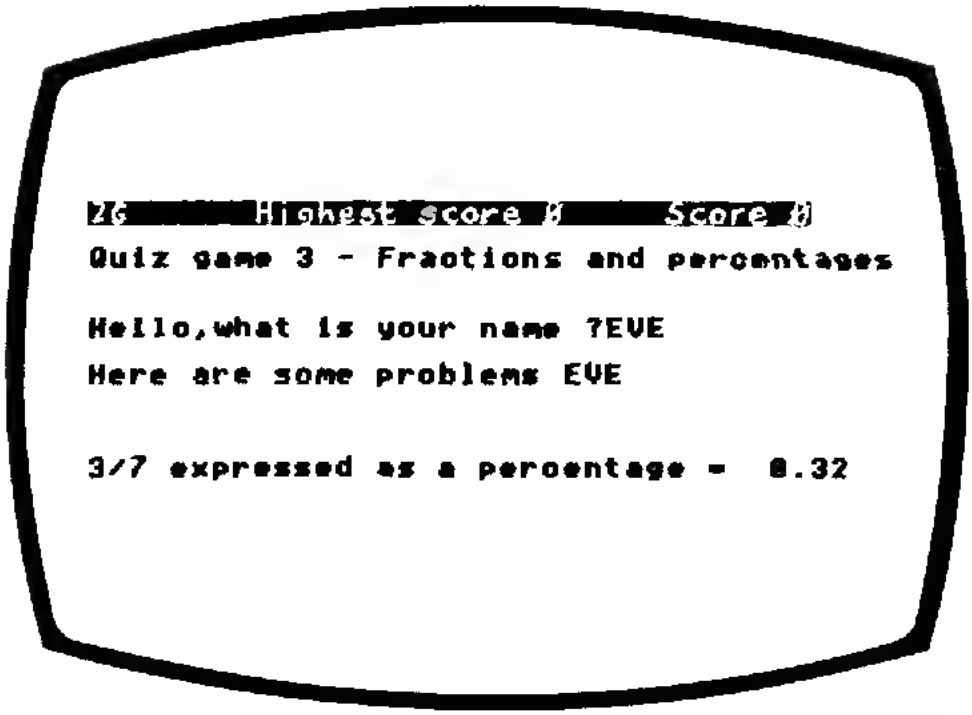
Program

```
  10 REM safe cracker
  20 REM ? G. LUDINSKI 1984
  25 DEF FN c$(a$,n)=a$( TO n)
  30 DEF FN e$(a$,m)=a$(m TO )
  40 LET BL=0: LET RD=1: LET YE=2: LET W
H=3: LET B=4
  45 DIM i$(2)
  50 LET SC=0
  70 PAPER BL+B: INK WH
```

```
  80 CLS
  90 PRINT AT 0,1;"Score": PRINT " ";SC
 100 REM
 110 REM draw safe closed
 120 REM
 130 INK 2: PAPER 6: PRINT AT 8,20;"?":
PLOT 79,159: DRAW 109,0: DRAW 0,-96: DRA
W -109,0: DRAW 0,96: PLOT 88,151: DRAW 9
3,0: DRAW 0,-80: DRAW -93,0: DRAW 0,80
 170 GO SUB 500
 180 INK 1: PRINT AT 14,1;"If you multip
ly the first digit by ";INT A1;" and the
 second digit by ";ABS INT (B1);" and ";
S$;" the result is ";INT C1;"."
 190 PRINT AT 18,1;"The 1st digit ";V$
 200 PRINT AT 18,20;"the 2nd digit is ";
INT C2: INPUT "what is the code?";i$
 220 PAUSE 10
 230 IF I$(1)=FN c$(A$,1) AND I$<>"E" TH
EN  GO TO 280
 240 IF I$="E" THEN  GO TO 700
 260 PRINT I$
 280 IF i$(2)=FN e$(A$,2) THEN  GO TO 30
0
 290 PAUSE 60: GO TO 380
 300 PRINT i$(1);i$(2)
 310 LET Z$=I$(1)+i$(2)
 320 IF Z$=A$ THEN  LET SC=SC+1: GO SUB
630: GO TO 60
 330 PRINT " No the code is ";ABS (VAL A
$)
 335 PAUSE 200
 340 GO TO 60
 350 REM
 360 REM SWITCH ON LIGHT AND SOUND SIREN
S
 370 REM
 380 PRINT "no the code is ";A$: FOR I=1
 TO 6: BEEP 1,10: BEEP 1,12: BEEP 1,10:
BEEP 1,12: LET R$=INKEY$: GO TO 60
```

```
 390 REM
 500 REM question
 510 LET A1=INT (RND*8)+2: LET B1=INT (R
ND*8)+2: LET XX=INT (RND*10): LET YY=INT
 (RND*10)
 520 LET W1=-1: IF RND>0.5 THEN  GO TO 5
25
 523 LET W1=1
 525 LET W2=-1: IF RND>0.5 THEN  GO TO 5
30
 527 LET W2=1
 530 LET B1=B1*W1
 540 LET C1=(A1*XX)+(B1*YY)
 550 LET C2=XX+(W2*YY)
 560 LET S$="add them then": IF W1=-1 TH
EN  LET S$="subtract them"
 570 LET V$="plus ": IF W2=-1 THEN  LET
V$="minus "
 580 LET A$=STR$ (ABS (XX))+STR$ (ABS (Y
Y))
 590 RETURN
 600 REM
 610 REM draw safe open
 620 REM
 630 INK 2: PAPER 6: PLOT 79,159: DRAW 1
09,0: DRAW 0,-96: DRAW -109,0: DRAW 0,7:
 PLOT 79,159: DRAW 0,-9: PLOT 88,151: IN
K 2: DRAW 93,0: DRAW 0,-80: DRAW -93,0:
INK 7: DRAW 0,80
 640 PRINT AT 8,20;" ": INK 2: PLOT 88,1
51: DRAW -80,-16: DRAW 0,-80: DRAW 80,16
 698 PAUSE 200
 699 RETURN
 700 STOP
```

FRACTIONS AND PERCENTAGES



If you have trouble converting percentages to fractions and vice versa then this is for you.

How to play

The playing instructions are the same as those in the Profit and Loss program which is to be found elsewhere in this book.

Programming hints

The conversion from fraction to percentage routine

expects the percentage value to be entered to two places of decimals i.e. it expects the player to key in 66.66 not 66.7. The trick to write a number to a certain number of decimal places is to multiply it by 10 to the power of the number of decimal places you require, then find the integral part, then divide by the same number. In the program the fraction F/G is multiplied by a further 100 before conversion as the number is a percentage.

Even though the answer is given to a certain number of decimal places any answer, provided it is within 1 of the correct answer is accepted. This is so that the answer is marked correct however inaccurate the method used to obtain it.

Different types of problems can be added as described in Profit and Loss.

Program

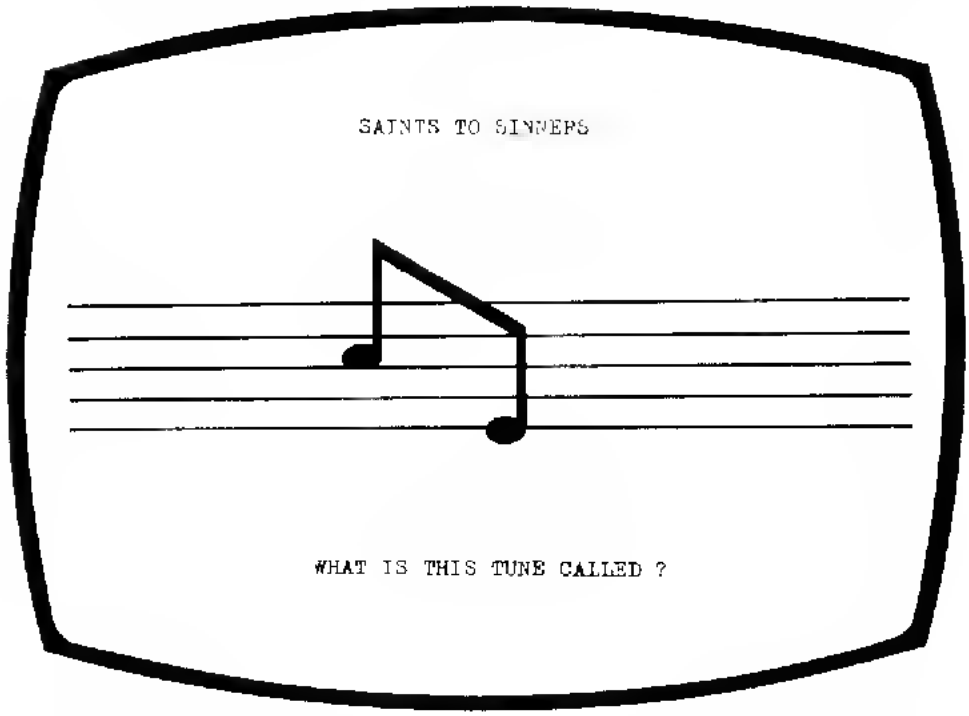
```
  10 REM quiz
  20 REM ?
  30 PAPER 5: INK 0: BORDER 1: CLS
  32 DEF FN r$(l$,n)=l$( TO n): REM left
$
  35 DEF FN t$(l$,m)=l$(m TO ): REM righ
t$
  40 DIM P$(255)
  50 LET S$="
     "
  60 LET H$="    Higest score ": LET K$=
"   SCORE"
  70 PRINT H$: PRINT : PRINT "Quiz game
3 - Fractions and     Percentages"
  80 PRINT : PRINT
  90 INPUT "Hello, what is your name ";N
$: PRINT : PRINT "Here are some problems
 ";: IF N$<>"NO SOUND" THEN  PRINT N$
```

```
 100 LET W=1: LET C=0: LET T=1: LET I$="
 ": LET P=0: LET MAX=0
 102 LET P=P+1
 104 GO SUB 248
 106 PRINT
 110 PRINT : PRINT Q$;"=";: GO SUB 560:
PRINT : IF w=-1 THEN  INPUT I$;"/";V$: G
O TO 130
 115 IF w=1 THEN  INPUT i$: GO TO 140
 130 IF LEN STR$ (j)=1 THEN  LET u=1: LE
T s=3
 131 IF LEN STR$ (j)=2 THEN  LET u=2: LE
T s=4
 135 IF W=-1 AND i$=FN r$(l$,u) AND v$=F
N t$(l$,s) THEN  GO TO 160
 140 IF W=1 AND i$=l$ THEN  GO TO 160
 150 GO TO 180
 160 PRINT : PRINT "Yes, congratulations
": LET C=C+1: PRINT : PRINT : IF N$="NO
SOUND" THEN  GO TO 210
 170 BEEP .2,12: BEEP .1,16: BEEP 1,20:
BEEP .2,10: BEEP .1,15: BEEP .4,20: GO T
O 220
 180 IF T=1 THEN  PRINT "No, ";H$;" try
again": LET T=2: GO TO 110
 190 PRINT "Sorry, the answer is = ": PR
INT L$: PRINT M$: PAUSE 1000
 200 PRINT C$
 220 IF p=10 THEN  GO TO 610
 221 LET I$=INKEY$: PRINT : PRINT "Do yo
u want more? (Y/N)": GO SUB 560: PRINT
 230 IF I$<>"Y" AND I$<>"N" AND I$<>"" A
ND I$<>"y" AND I$<>"n" THEN  GO TO 220
 240 IF I$="Y" OR I$="y" OR I$="" THEN
LET T=1: CLS : GO TO 102
 244 GO TO 9999
 248 REM QUESTION
 250 LET L$="": LET M$="": LET C$=""
 260 LET W=-W: LET F=INT (RND*9)+1
 270 LET G=INT (RND*9)+1: LET J1=INT (RN
D*19)+1
```

```
 280 IF F=G OR F/G=INT (F/G) OR G/F=INT
(G/F) THEN  GO TO 260
 290 IF F<G THEN  LET E=INT (F/G*100): L
ET J=J1*5
 300 IF G<F THEN  LET E=INT (G/F*100): L
ET H=G: LET G=F: LET F=H: LET J=J1*2
 310 LET E$=STR$ (E): LET F$=STR$ (F): L
ET G$=STR$ (G): LET J$=STR$ (J)
 320 IF W=1 THEN  GO TO 410
 330 LET Q$=J$+"% converted into a fract
ion"
 340 LET H$="P% is P/100. If top and
 bottom of the fraction are      exactly
 divisible by the         numbers,then di
vide by these    numbers."
 350 LET HU=100: FOR I=1 TO 8
 360 IF J/5=INT (J/5) AND HU/5=INT (HU/5
) THEN  LET J=J/5: LET HU=HU/5
 370 IF J/2=INT (J/2) AND HU/2=INT (HU/2
) THEN  LET J=J/2: LET HU=HU/2
 380 NEXT I: LET A$=STR$ (J)+"/"+STR$ (H
U)
 390 LET L$=A$
 400 LET M$="as "+J$+"/100 = "+A$
 410 IF W=-1 THEN  GO TO 460
 420 LET Q$=F$+"/"+G$+" expressed as a p
ercentage"
 430 LET H$="P/Q IS (P/Q)x100%"
 440 LET A$=STR$ (INT (F*10000/G)/100):
LET L$=A$+"%"
 450 LET M$="as ("+F$+"/"+G$+")x100="+A$
 460 RETURN
 560 PAUSE 0
 570 LET I=1: LET VP=0: LET HP=10
 572 LET P$(I)=INKEY$: IF P$(I)="" THEN
 PAPER 3: INK 2: PRINT ;1,0;"  ";H$;MAX;
K$;C: PAPER 2: INK 4
 590 LET I$="": FOR x=1 TO I-1: LET I$=I
$+P$(I): NEXT x
 600 RETURN
 610 REM  score
```

```
 620 CLS
 630 PRINT : PRINT "Number of problems c
ompleted =";P
 640 PRINT : PRINT "Number correct =";C
 670 IF C>MAX THEN  LET MAX=C
 680 LET P=0: LET C=0
 690 GO TO 220
 700 REM
```

SAINTS TO SINNERS



Here is a musical test for the members of your family who have a keen ear for a tune.

The object of the game is to guess the tune being played and to make it easy, to begin with, we have allowed your computer to play the entire tune. After the first ten 'numbers' you will only hear a short snatch from the tune.

We have included a very large selection of tunes suitable for 'saints and sinners'.

To make life more difficult for the player we have entered the tunes, using a special code, so that they cannot be guessed at in advance.

How to play

When you think that you have guessed, correctly, the title of the tune being played, type in the full title press RETURN and find out if your ear is musical, or tin.

Programming hints

Lines 200-470 contains the procedure that plays the tune. The notes of the tune are held in the first and second, if any, elements of the array A$ and the name of the tune is held in N$. W is the indicator determining which tune is to be played. The tune stored in array A$ is terminated by the letters XXXXX. If more than one element of the array is needed to store the tune, the first element is terminated by the letters NNNNN. Storing data in a string variable is a very useful trick when there are too many fields to be assigned to use assignment statements, and when you do not wish to use DATA statements, as you will be accessing data randomly, not sequentially. See the section entitled Possible alterations for further details.

The obvious alteration that can be made, are that when you know the names of the tunes you will want to change them. If you wish to increase the number of tunes that can be played then you must increase the maximum value of W held in line 100. You could then include your tune between 380 and 390 starting with a statement ensuring that the tune is skipped over if the value of W is not the correct one. You could then work out the tune your require on an instrument, or else you could copy a musical score. If you are copying a musical score then you should refer to the User Guide, but if you are doing it for fun then I recommend a child's musical instrument which usually just has the octave that starts with middle

C which is the most common octave. The pitch numbers for this octave are:

Middle	C 053
	D 061
	E 069
	F 073
	G 081
	A 089
	B 097
	C 101

The duration of the notes should be smaller numbers than specified in the User Guide as processing the array takes time. Therefore I suggest that the durations should be 03,08 and 18 approximately for notes of short, middle or long duration. When you have worked out the pitch and duration of all the notes, you should assign them to the first and, if more room is required, the second element of the array. The pitch number must have three digits and the duration must have two and they should be joined together and separated from details of the next note by a space. As stated before, the first element is terminated by NNNNN and the second element by XXXXX.

I do not expect you will bother to put the name of the tune in code, but in case you do N$ is made up of the ASCII values of the letters of the name of the tune, remembering to include spaces which have an ASCII value of 32.

Program

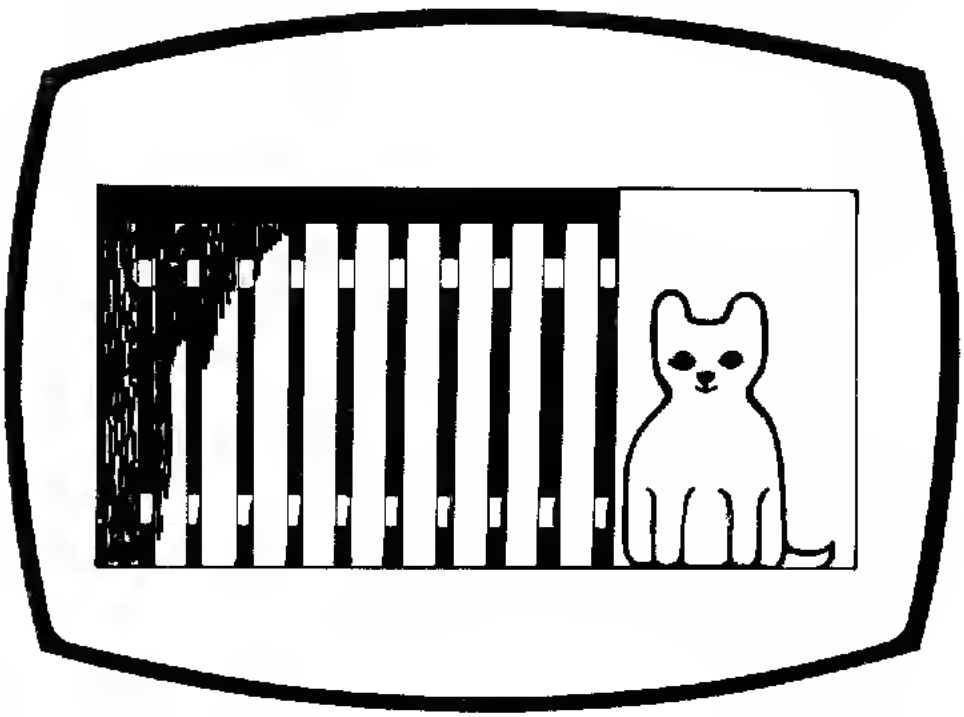
```
10 REM saints to sinners
20 REM ?
25 DIM a$(60)
```

```
  30 DEF FN t$(a$,n,M)=a$(n TO M)
  60 PAPER 2: INK 0: BORDER 1: CLS
  80 PRINT  INK 7; BRIGHT 1;AT 1,5;" SAI
NTS TO SINNERS"
  90 GO SUB 500
 100 LET W=INT (RND*4)+1
 110 GO SUB 190
 112 REM  LET a$="": FOR i=1 TO LEN (m$)
 STEP 2: LET A$=a$+CHR$ (VAL FN t$(m$,i,
i+1)): NEXT i
 114 REM INPUT AND CHECK ANSWER
 115 PRINT AT 4,0;"What is the tune call
ed?"
 120 INPUT i$
 130 IF i$<>M$ THEN  GO TO 136
 135 PRINT AT 6,0;"Yes, you are right":
GO TO 140
 136 PRINT : PRINT "No, it is called ";M
$
 140 INPUT "Do you want more? (Y/N)";e$
 150 IF e$<>"y" AND e$<>"Y" AND e$<>"n"
AND e$<>"N" THEN  GO TO 140
 155 IF e$="y" OR e$="Y" THEN  GO TO 10
 160 GO TO 700
 190 REM play tune
 200 IF w<>1 THEN  GO TO 260
 210 LET m$="FRERE GUSTAV"
 220 BEEP 1,0: BEEP 1,2: BEEP .5,3: BEEP
 .5,2: BEEP 1,0
 230 BEEP 1,0: BEEP 1,2: BEEP .5,3: BEEP
 .5,2: BEEP 1,0
 235 BEEP 1,3: BEEP 1,5: BEEP 2,7
 240 BEEP 1,3: BEEP 1,5: BEEP 2,7
 245 BEEP .75,7: BEEP .25,8: BEEP .5,7:
BEEP .5,5: BEEP .5,3: BEEP .5,2: BEEP 1,
0
 250 BEEP .75,7: BEEP .25,8: BEEP .5,7:
BEEP .5,5: BEEP .5,3: BEEP .5,2: BEEP 1,
0
 255 BEEP 1,0: BEEP 1,-5: BEEP 2,0
 257 BEEP 1,0: BEEP 1,-5: BEEP 2,0
```

```
 258 RETURN
 260 REM
 265 IF w<>2 THEN  GO TO 350
 270 LET m$="THE FIRST NOEL"
 280 BEEP .5,4: BEEP .5,2: BEEP .7,0: BE
EP .2,4: BEEP .5,5: BEEP .5,7: BEEP .7,9
: BEEP .3,11: BEEP .5,12: BEEP .5,11: BE
EP .5,9: BEEP .5,7: BEEP .5,9: BEEP .5,1
1: BEEP .5,12: BEEP .5,7: BEEP .5,5: BEE
P .5,4: BEEP .2,4: BEEP .4,2: BEEP .5,0
 290 BEEP .5,2: BEEP .5,4: BEEP .5,5: BE
EP .5,7: BEEP .5,9: BEEP .5,11: BEEP .5,
12: BEEP .5,9: BEEP .5,7: BEEP .5,9: BEE
P .5,11: BEEP .5,12: BEEP .5,11: BEEP .5
,9: BEEP .5,7: BEEP .5,9: BEEP .5,11: BE
EP .5,12: BEEP .5,5: BEEP .5,4
 349 RETURN
 350 REM
 354 IF W<>3 THEN  GO TO 410
 356 LET M$="ONCE IN ROYAL DAVID'S CITY"
 360 BEEP .5,5: BEEP .5,9: BEEP .5,10: B
EEP .2,10: BEEP .5,10: BEEP .5,10: BEEP
.5,9: BEEP .5,10: BEEP .5,11: BEEP .5,11
: BEEP .5,10: BEEP .5,10: BEEP .7,14: BE
EP .7,16: BEEP .3,14: BEEP .3,12: BEEP .
5,11: BEEP .5,10: BEEP .5,9: BEEP .5,7
 409 RETURN
 410 REM
 415 IF w<>4 THEN  GO TO 450
 416 LET M$="GOOD KING WENCESLAS LAST LO
OKED OUT"
 420 BEEP .5,5: BEEP .5,5: BEEP .5,5: BE
EP .5,7: BEEP .5,5: BEEP .7,5: BEEP .5,0
: BEEP .5,2: BEEP .5,0: BEEP .5,2: BEEP
.6,4: BEEP .7,5: BEEP .5,5: BEEP .5,5: B
EEP .5,5: BEEP .5,5: BEEP .5,5: BEEP .7,
7: BEEP .4,5: BEEP .4,5: BEEP .4,0: BEEP
 .4,2: BEEP .6,0: BEEP .7,2: BEEP .5,4:
BEEP .5,5: BEEP .5,5
 449 RETURN
 450 REM
```

```
 455 IF w<>5 THEN  GO TO 100
 456 LET M$="MORNING HAS BROKEN"
 460 BEEP .5,0: BEEP .5,4: BEEP .4,7: BE
EP .5,12: BEEP .5,14: PAUSE 10: BEEP .5,
11: BEEP .5,9: BEEP .5,7: BEEP .5,9: BEE
P .5,7: PAUSE 10: BEEP .5,0: BEEP .5,2:
BEEP .5,4: BEEP .5,7: BEEP .5,9
 470 BEEP .5,7: BEEP .5,4: BEEP .5,0: BE
EP .5,2: PAUSE 10: BEEP .5,0: BEEP .5,4:
 BEEP .5,7: BEEP .5,12: BEEP .5,14: BEEP
 .5,11: BEEP .5,9: BEEP .5,7: BEEP .5,9:
 BEEP .5,7: PAUSE 5: BEEP .5,0: BEEP .5,
2: BEEP .5,4: BEEP .5,7: BEEP .5,9: BEEP
 .5,4: BEEP .5,0: BEEP .5,2: BEEP .5,0
 499 RETURN
 500 REM DRAW RADIO
 510 PLOT 63,63: DRAW 96,0: DRAW 0,-56:
DRAW -96,0: DRAW 0,56: DRAW 0,-8: DRAW 9
6,0: DRAW 0,-8: DRAW -96,0
 520 CIRCLE 74,36,4: CIRCLE 90,36,4: PLO
T 103,39: DRAW 40,0: DRAW 0,-24: DRAW -4
0,0: DRAW 0,24
 600 RETURN
 610 REM
 700 STOP
```

DON'T PAINT THE CAT



Seems a strange title for a program. I mean, who would want to emulsion paint the family mogg anyway?

Well you see, the family have decided that you have to paint the garden fence. You lost the draw — it might have been your sister instead who had to do it, but never mind there is always next time. Across the fence from you and your fantastic paint brush, is your neighbour's transistor. As a mental challenge you have decided to paint the fence according to the high/low pitch of your neighbour's music.

Look out for your cat, it's parked at the end of the fence.

How to play

As the game begins you will hear just two notes to compare but, everytime you get the answer correct the next tune will have an extra note.

You will be told which two notes to compare, and you must key in H or L for High or Low.

If you take too long to answer, the cat will wind up getting covered in paint.

Press the RETURN key when you want a new tune.

Program

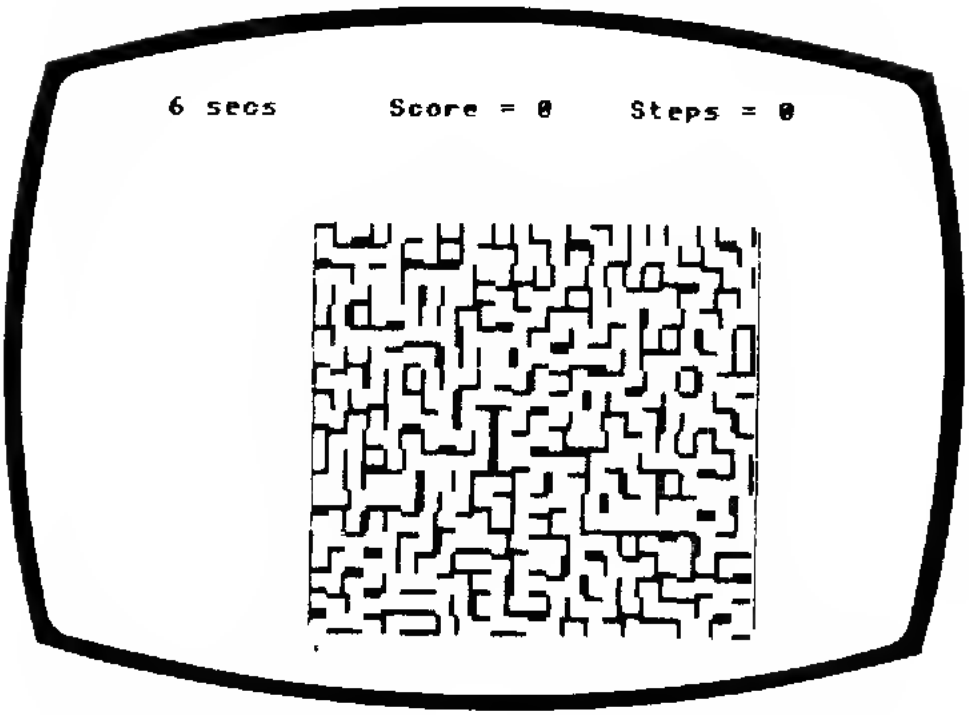
```
  1 REM
  9 REM Don't paint the cat
 10 REM
 11 REM ?
 12 REM
 13 REM define graphic
 14 RESTORE : GO SUB 800
 30 REM
 35 REM clear screen
 36 REM
 40 DIM N(11)
 50 BORDER 1: PAPER 4: INK 0: CLS
140 REM
150 REM start game
160 REM
170 FOR j=2 TO 9
180 REM
190 REM draw fence
195 REM
200 GO SUB 600
300 REM
310 REM choose which notes
```

```
 320 REM
 340 LET W=INT (RND*J)+1: LET A=INT (RND
*J)+1: IF W=A THEN  GO TO 340
 350 LET F$="th": IF W=1 THEN  LET F$="s
t"
 360 LET G$="th": IF A=1 THEN  LET G$="s
t"
 370 IF W=2 THEN  LET F$="nd"
 380 IF A=2 THEN  LET G$="nd"
 390 IF W=3 THEN  LET F$="rd"
 400 IF A=3 THEN  LET G$="rd"
 410 PRINT AT 16,0;"Is the ";W;F$;" note
 in the tune     higher or lower than th
e ";A;G$;"    note.": PRINT "Press H or
L": PAUSE 30
 440 REM
 450 REM PLAY THE TUNE
 460 REM
 465 FOR k=1 TO j
 470 LET N(K)=INT (RND*20): IF k=1 THEN
 GO TO 490
 475 REM
 476 REM ensure no note is       repeate
d
 477 REM
 480 FOR q=k-1 TO 1 STEP -1: IF N(K)=N(q
) THEN  GO TO 470
 485 NEXT q
 490 BEEP .75,N(K)
 500 NEXT K
 501 REM
 502 REM calculate correct answer
 503 REM
 505 IF N(W)>N(A) THEN  LET A$="H"
 510 IF N(W)<N(A) THEN  LET A$="L"
 515 REM
 516 REM paint fence
 517 REM
 520 GO SUB 850
 525 REM
 526 REM check answer
```

```
 527 REM
 530 IF (a$="H" AND (i$="H" OR i$="h"))
OR (a$="L" AND (i$="L" OR i$="l")) THEN
 PRINT AT 20,0;"Yes, you are correct": F
OR w=1 TO 100: NEXT w: PRINT AT 21,0;"an
y key to continue": PAUSE 0: PAUSE 0: NE
XT j: GO TO 2000
 540  PRINT AT 20,0;"You are incorrect.
the answer      was; """;a$;""""
 550 FOR w=1 TO 250: NEXT w: GO TO 10
 590 REM
 599 REM draw fence
 600 REM
 601 INK 0: PAPER 4: BORDER 1: CLS
 602 FOR x=15 TO 169 STEP 16
 605 LET y=159: LET z=8: LET q=104
 610 PLOT x,y: DRAW z,0: DRAW 0,-q: DRAW
 -z,0: DRAW 0,q
 612 NEXT x
 620 FOR a=23 TO 151 STEP 16: LET b=143:
 LET c=135: LET d=79: LET e=71
 630 PLOT a,b: DRAW 8,0: NEXT a
 635 FOR a=23 TO 151 STEP 16: LET b=143:
 LET c=135: LET d=79: LET e=71
 640 PLOT a,c: DRAW 8,0: NEXT a
 645 FOR a=23 TO 151 STEP 16: LET b=143:
 LET c=135: LET d=79: LET e=71
 650 PLOT a,d: DRAW 8,0: NEXT a
 655 FOR a=23 TO 151 STEP 16: LET b=143:
 LET c=135: LET d=79: LET e=71
 660 PLOT a,e: DRAW 8,0: NEXT a
 670 PRINT AT 14,24;"?"
 704 REM
 705 REM draw border
 706 REM
 710 PLOT 0,0
 720 DRAW 255,0: DRAW 0,175: DRAW -255,0
: DRAW 0,-175
 730 RETURN
 790 REM
 791 REM define graphic
```

```
 792 REM
 800 FOR n=0 TO 7
 810 READ r: POKE USR "p"+n,r
 820 NEXT n
 830 DATA 0,36,60,60,60,25,62,60
 840 RETURN
 844 REM
 845 REM paint fence
 846 REM
 851 FOR x=15 TO 159 STEP 16
 860 FOR y=55 TO 159: LET r=8
 861 REM
 862 REM check for answer
 863 REM
 065 IF INKEY$<>"" THEN  LET i$=INKEY$:
GO TO 900
 870 INK 7: PLOT x,y: DRAW r,0: NEXT y:
NEXT x
 880 PRINT AT 14,24; PAPER 4; INK 7;"?":
 GO TO 1000
 900 IF i$<>"1" AND i$<>"L" AND i$<>"h"
AND i$<>"H" THEN  GO TO 870
 910 RETURN
 990 REM
 995 REM cat painted
 996 REM
1000 PRINT AT 20,0;"Too late! The correc
t answer       was; """;A$;"""
1010 FOR w=1 TO 300: NEXT w: INPUT "agai
n? Y/N";r$: IF r$<>"n" AND r$<>"N" THEN
 GO TO 10
1020 NEW
1990 REM
1995 REM all 8 correct
1996 REM
2000 FLASH 1: PRINT AT 0,0; OVER 1;,,,,,
,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,:
 FOR w=1 TO 500: NEXT w: FLASH 0: CLS
2001 BORDER 5: PAPER 2: INK 7: CLS : PRI
NT AT 11,2;"A musician like yourself
    should not be painting fences!": STO
P
```

A-MAZE-ING



You are at the bottom of a complicated maze, and your objective is to reach the top in the quickest possible time, but also with the fewest number of moves possible.

Don't rush headlong into this one, as a little forward planning can save you time and points.

Every step counts as a point and every time you try to cross a barrier counts as a point.

You must aim for the nearest exit at the top.

How to play

You are represented by a dot in the lower left hand side of the maze, and you move by using the ARROW cursor keys. Do not press the shift key, just the keys with the arrows on.

Your score will be displayed at the top of the screen. The number of steps taken has a greater effect on your final score than the time factor.

You may, of course, retrace your steps and begin again from any point you wish to. When you reach the top, or you wish to give up, press the BREAK key, (shifted space) and then RUN.

We hope you make it, as there are plenty of other 'Brainteasers' waiting for you on the outside.

Programming hints

The maze is created of cells, each of which have one side blocked off. The cell shapes are drawn using user-defined graphics.

You could increase the size of the maze by changing 21 and 25 in lines 230 and 260. The maze shown is 24 columns wide by 20 rows. the maze array m must be DIMensioned 2 columns and 2 rows larger than the actual array to allow for checking for the (x+1)th and (x−1)th columns, and (y+1)th and (y−1) rows. If you want the maze in the centre on the screen then change line 240.

The lines drawn down the side of the maze in lines 310 and 320 would have to be changed, so would the start

position of the dot in lines 330 and 340. In a 20 row maze the 21st row is the row the dot starts on, so special conditions apply to this row in lines 370 to 460. If a different number of rows is chosen this 21 and 22 must be changed. The 21st row of the maze is represented by the 22nd row of the array m. It was made this way to allow the top and bottom row to be checked.

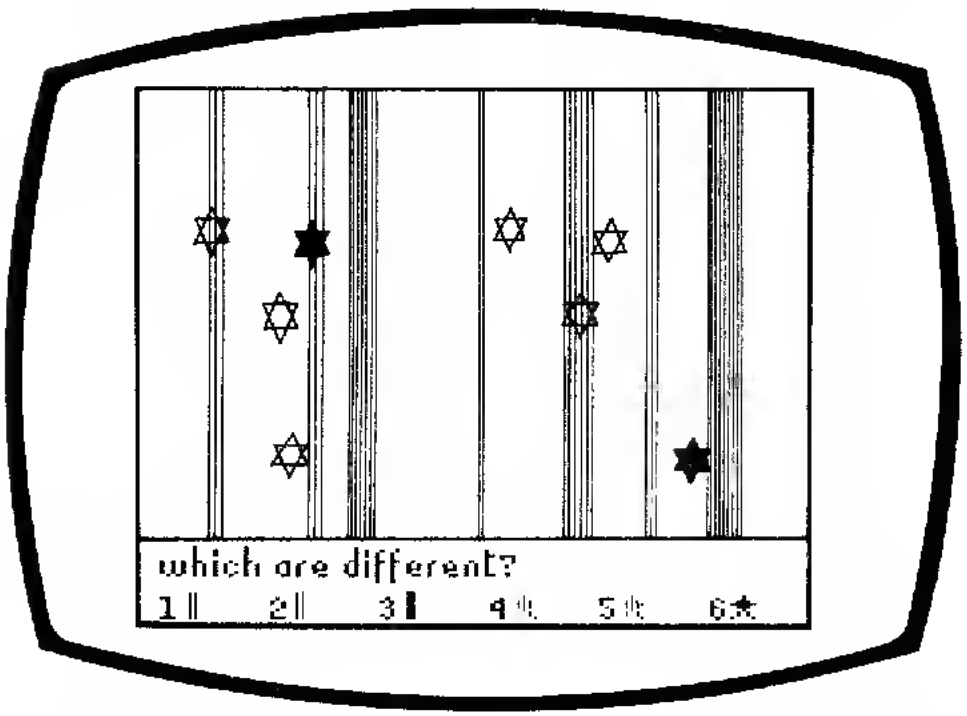
Program

```
  10 REM A-maze-ing
  20 REM copyright   G.Ludinski 1983
  30 DIM m(26,23)
  40 BORDER 7: PAPER 7: INK 1: CLS
  50 LET 1$="5": LET r$="8": LET d$="6":
 LET u$="7"
  60 DEF FN u()=(65536*PEEK 23674+256*PE
EK 23673+PEEK 23672)/50
  70 DEF FN m(q,r)=(q+r+ABS (q-r))/2
  80 DEF FN t()=FN m(FN u(),FN u())
  90 RESTORE
 100 FOR n=1 TO 8: READ p$
 110 FOR f=0 TO 7
 120 READ a: POKE USR p$+f,a
 130 NEXT f
 140 NEXT n
 150 DATA "a",3,3,3,3,3,3,3,3
 160 DATA "b",0,0,0,0,0,0,255,255
 170 DATA "c",192,192,192,192,192,192,19
2,192
 180 DATA "d",255,255,0,0,0,0,0,0
 190 DATA "e",3,3,3,BIN 00011011,BIN 000
11011,3,3,3
 200 DATA "f",0,0,0,BIN 00011000,BIN 000
11000,0,255,255
 210 DATA "g",192,192,192,BIN 11011000,B
IN 11011000,192,192,192
 220 DATA "h",255,255,0,BIN 00011000,BIN
 00011000,0,0,0
```

```
 230 FOR i=2 TO 21
 240 PRINT : PRINT "     ";
 250 LET m(1,i)=0
 260 FOR j=2 TO 25
 270 LET m(j,i)=INT (RND*4)
 280 PRINT CHR$ (144+m(j,i));
 290 NEXT j
 300 NEXT i
 310 PLOT 31,168: DRAW 0,-160
 320 PLOT 224,168: DRAW 0,-160
 330 LET st=0: LET x=2: LET y=22: LET x1
=2: LET y1=22: LET t1=FN t()
 340 PRINT AT y-1,x+2;".";CHR$ 8;
 350 LET sc=st+INT ((FN t()-t1)/5)
 360 LET i$=INKEY$: IF i$="" OR CODE i$<
53 OR CODE i$>56 THEN  PRINT AT 0,0;INT
(FN t()-t1);" secs  Score = ";sc;"  Step
s = ";st: GO TO 360
 370 IF (x=2 AND i$=l$) OR (x=25 AND i$=
r$) OR (y=2 AND i$=u$) OR (y=22 AND i$=d
$) THEN  GO TO 350
 380 IF i$=l$ AND ((m(x-1,y)<>0 AND m(x,
y)<>2) OR y=22) THEN  LET x=x-1
 390 IF i$=r$ AND ((m(x+1,y)<>2 AND m(x,
y)<>0) OR y=22) THEN  LET x=x+1
 400 IF i$=d$ AND ((m(x,y+1)<>3 AND m(x,
y)<>1) OR y=22) THEN  LET y=y+1
 410 IF i$=u$ AND ((m(x,y-1)<>1 AND m(x,
y)<>3) OR y=22) THEN  LET y=y-1
 420 LET st=st+1
 430 IF y1=22 THEN  PRINT AT 21,x1+2;" "
;
 440 IF y=22 THEN  PRINT AT 21,x+2;".";
 450 IF y1<>22 THEN  PRINT AT y1-1,x1+2;
CHR$ (144+m(x1,y1));CHR$ 8;
 460 IF y<>22 THEN  PRINT AT y-1,x+2;CHR
$ (148+m(x,y));CHR$ 8;
 470 IF x=x1 AND y=y1 AND st<>0 THEN  BE
EP 1,0
```

```
 480 IF y=2 AND m(x,y)<>3 THEN  FOR i=-1
0 TO 0: BEEP 0.0125,i: NEXT i: FOR i=0 T
0 -5 STEP -1: BEEP 0.0125,i: NEXT i: GO
TO 480
 490 LET x1=x: LET y1=y
 500 GO TO 350
```

SPOT THE DIFFERENCE



I suppose that this could have been called Star and Stripe, the difference as you will see when you run this colourful eye test.

Two pictures, composed of stars and stripes, in red, green and blue appear on the screen, and you will be asked to identify which of the items is different.

How to play

Items are keyed as follows:

Blue stripe	1
Green stripe	2

Red stripe	3
Blue star	4
Green star	5
Red star	6

Identify the differences and key in the number and press RETURN. If you are correct you will hear a high pitched tune, but if you are wrong your answer will be crossed.

To help you, numbers previously keyed in are displayed in brackets. When all the numbers required have been keyed in a further tune will be played. Just hope that it is high pitched for a correct answer.

To continue, or stop, press Y or N and RETURN.

At conclusion you will see your score sheet showing tries, correct answers, and time/average taken.

Programming hints

You might find the routine star useful in your non-commercial programs as it draws a star. You just have to specify the bottom left-hand corner of the star (x,y), the width of the bottom of the star (w), the height of the star (h) and the colour that it is to be displayed in (cl).

You could make the puzzle easier by increasing the range of possible values for the shapes that are going to be different. The function FNm (n,m) is used to define the minimum and maximum value of any shape. Remember if you increase the maximum value m you must reduce the minimum value n by the same value, or the picture will extend beyond the allocated area.

Program

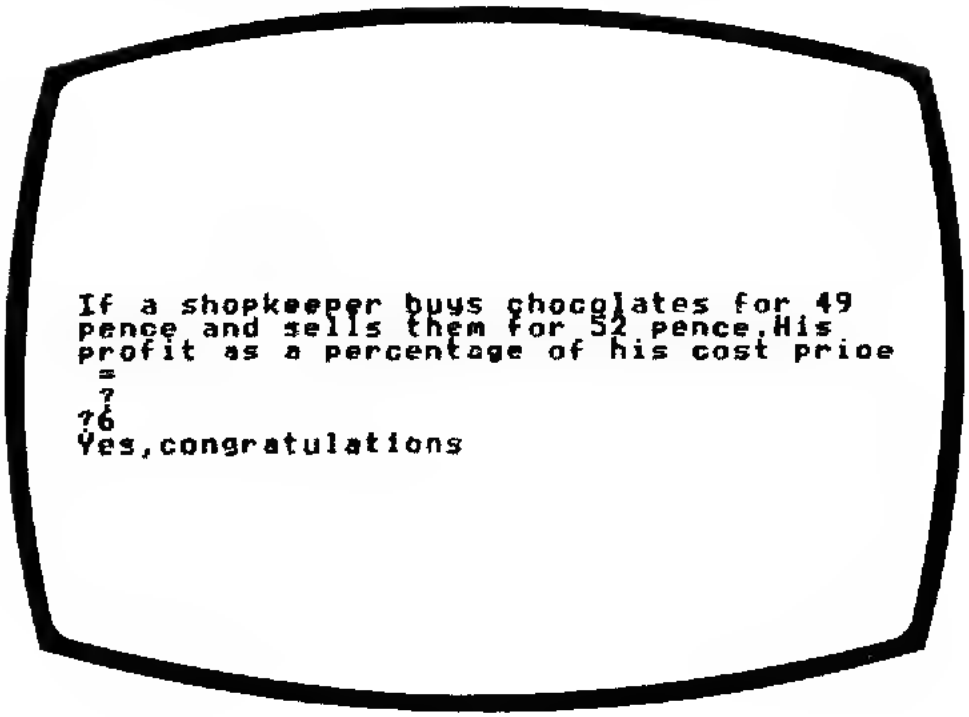
```
  10 REM Spot the difference
  20 REM copyright ? G.Ludinski 1983
  30 LET stripe=780: LET star=840: LET a
nswer=900: LET htriang=1030: LET triang=
980
  40 PAPER 7: BORDER 7: INK 0: CLS
  50 DEF FN u()=(65536*PEEK 23674+256*PE
EK 23673+PEEK 23672)/50
  60 DEF FN l(m,n)=(m+n+ABS (m-n))/2
  70 DEF FN t()=FN l(FN u(),FN u())
  80 DIM w(6): DIM b$(6,1)
  90 LET time1=FN t(): LET cr=0: LET nq=
0
 100 POKE 23561,255: REM remove automati
c key repeat
 110 GO TO 130
 120 DEF FN m(n,m)=INT ((m-n)*RND+n)
 130 RESTORE
 140 FOR n=1 TO 2
 150 READ p$: FOR l=0 TO 7: READ row: PO
KE USR p$+l,row: NEXT l
 160 NEXT n
 170 DATA "?",30,30,30,30,30,30,30,30
 180 DATA "?",0,BIN 00010000,BIN 0011100
0,BIN 11111110,BIN 01111100,BIN 01101100
,BIN 11000110,BIN 10000010
 190 CLS
 200 LET nq=nq+1
 210 PLOT 0,45: DRAW 255,0
 220 DRAW 0,130: DRAW -255,0: DRAW 0,-13
0
 230 PLOT 127,45: DRAW 0,130
 240 LET nz=0
 250 FOR i=1 TO 6
 260 LET w(i)=INT (2*RND)
 270 IF w(i)=1 THEN  LET nz=nz+1
 280 NEXT i
 290 IF nz=0 THEN  GO TO 250
```

```
 300 FOR j=1 TO 3
 310 LET x=40*(j-1)+7
 320 LET w=FN m(5,10)
 330 LET ij=j
 340 LET cl=j: IF j=2 THEN  LET cl=4
 350 IF j=3 THEN  LET cl=2
 360 GO SUB stripe
 370 LET x=x+127: LET w=w+(w(ij)*FN m(5,
10)): GO SUB stripe
 380 LET x=40*(j-1)+27: LET h=FN m(w,2*w
): LET w=5: LET y=FN m(45,175-h)
 390 LET ij=j+3
 400 LET cl=j: IF j=2 THEN  LET cl=4
 410 IF j=3 THEN  LET cl=2
 420 GO SUB star
 430 LET x=FN m(x+127,40*(j-1)+154): LET
  w=w+(w(ij)*FN m(3,6)): LET h=h-(w(ij)*F
N m(h/4,3*h/4)): GO SUB star
 440 NEXT j
 450 INK 0: PRINT AT 18,0;"   Which shap
es are different"
 460 PRINT "       ";: INK 1: PRINT "1 =
?  ";: INK 4: PRINT "2 = ?  ";: INK 2: P
RINT "3 = ? "
 470 PRINT "       ";: INK 1: PRINT "4 =
?  ";: INK 4: PRINT "5 = ?  ";: INK 2: P
RINT "6 = ?"
 480 GO SUB answer
 490 INK 0
 500 LET r$=""
 510 FOR i=1 TO (LEN a$+1)/2
 520 LET i$=INKEY$: IF i$="" THEN  GO TO
 520
 530 PRINT AT 21,0;"
          ";AT 21,0;i$;" (";r$;" )";
 540 LET ki=0
 550 FOR k=1 TO na
 560 IF i$=b$(k) THEN  LET b$(k)="0": LE
T ki=1: BEEP .5,12: LET r$=r$+i$
 570 NEXT k
 580 IF ki=0 THEN  PRINT " X": GO TO 600
```

```
 590 PRINT
 600 IF INKEY$<>"" THEN  GO TO 600
 610 NEXT i
 620 FOR i=1 TO na
 630 IF b$(i)<>"0" THEN  GO TO 660
 640 NEXT i
 650 GO TO 670
 660 PRINT AT 18,0;"
              ": PRINT AT 18,0;"No,answer
=";a$: BEEP .5,10: BEEP .2,4: GO TO 680
 670 PRINT AT 21,11;"Yes,you are right":
 BEEP 2,12: LET cr=cr+1
 680 PRINT AT 21,0;"Do you want more (Y/
N)         ";
 690 INPUT i$
 700 IF i$<>"n" THEN  GO TO 190
 710 CLS : PRINT : PRINT "       Spot the
 difference": FOR i=1 TO 4: PRINT : NEXT
 i
 720 PRINT : PRINT "Puzzles attempted ="
;nq
 730 PRINT : PRINT "Puzzles correct =";c
r
 740 LET tm=INT (FN t()-time1)
 750 PRINT : PRINT "Time taken =";tm;" s
ecs"
 760 IF cr<>0 THEN  PRINT : PRINT "Time
taken per puzzle =";INT (tm*100/cr)/100;
" secs"
 770 GO TO 1080
 780 REM stripe subroutine
 790 INK c1
 800 FOR i=x TO x+w
 810 PLOT i,45: DRAW 0,130
 820 NEXT i
 830 RETURN
 840 REM star subroutine
 850 INK c1
 860 LET x0=x: LET y0=y: LET x1=x+(w/2):
 LET y1=y+(h/3): LET x2=x+(w/2): LET y2=
y+h: GO SUB triang
```

```
 870 LET x0=x+w: LET y0=y: GO SUB triang
 880 LET x1=x-w/2: LET y1=y+(2*h/3): LET
 x0=x+w/2: LET y0=y+h/3: LET x2=x+(3*w/2
): LET y2=y+(2*h/3): GO SUB htriang
 890 RETURN
 900 REM answer subroutine
 910 LET a$="": LET im=0
 920 FOR l=1 TO 6
 930 IF w(l)=1 THEN  LET im=im+1: LET b$
(im)=STR$ l: LET a$=a$+STR$ l+","
 940 NEXT l
 950 LET a$=a$( TO LEN a$-1)
 960 LET na=im
 970 RETURN
 980 REM triang subroutine
 990 FOR p=y1-y0 TO y2-y0
1000 PLOT x0,y0: DRAW x1-x0,p
1010 NEXT p
1020 RETURN
1030 REM htriang
1040 FOR p=x1-x0 TO x2-x0
1050 PLOT x0,y0: DRAW p,y1-y0
1060 NEXT p
1070 RETURN
1080 REM end
```

PROFIT AND LOSS



How much do you know about profit and loss?

Do you know how much you would make if you sold your car, or even your bike?

How to play

You will be given five minutes to answer as many questions as possible, and you may press P and RETURN for pass if you cannot work out an answer.

You will not be penalised for 'passes'.

At the end of five minutes, or sooner if you enter N for NO in answer to the question "do you want any more", your score sheet showing tries, correct answers and average time per answer will appear. If you wish to proceed, then press Y and RETURN and the program will continue to ask you questions.

You can have two tries at each question if you wish. After the first attempt, you will be given a hint as to the correct answer. If your second answer is wrong, you will be told the solution and how it was obtained.

If you cannot work out an answer then press ? and RETURN and your computer will turn into a calculator and you can then use the normal mathematical symbols on the keyboard. To clear the calculator from the screen press AC and RETURN. For the calculators answer press = and RETURN. To return to the main game press ? and RETURN. Always remember to press RETURN after each required response.

Programming hints

This program includes a useful procedure that enables a programmer to fit a sentence, or string, of any length onto a screen of any size, without splitting a word between one screen line and another, i.e. wraparound, and is found on line 530.

Assign the string, or sentence in quotes, to variable FL$. B holds the number of characters on the screen in the case of Mode 4 it is 40. On exit the field FL$ contains the string, or sentence, re-formatting so no words are split between one 40 column line and another.

You may want to add some different types of problems

on profit and loss. To do this, instead of W alternating between -1 and +1, it should be allowed to take a random value between 0 and one more than the number of problem types you are going to add. The details of the problem must be put in the QUESTION subroutine. Q$ holds the question, H$ the hint, A and A$ the answer and L$, M$ and N$ the answer and explanation.

Program

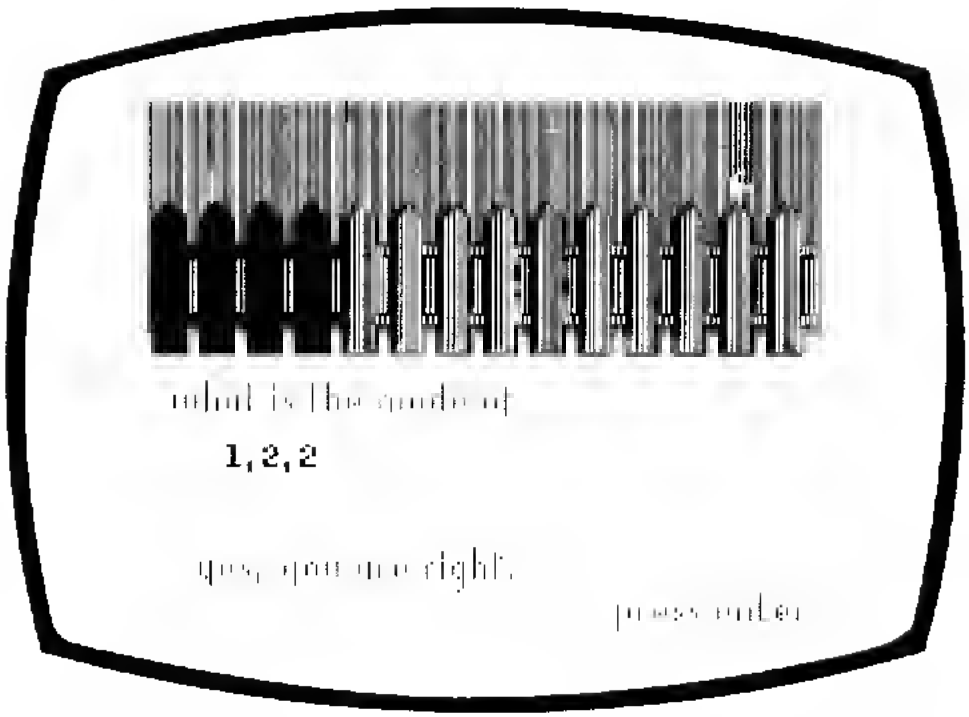
```
  20 REM
  30 DEF FN e$(a$,n,n)=a$(n TO n)
  32 DEF FN v$(a$,m)=a$(m TO )
  35 DEF FN z$(a$,b)=a$( TO b)
  40 DIM p$(10)
  45 PAPER 6: INK 2: BORDER 6: CLS
  50 LET S$="                    "
  60 LET C$="Highest score ": LET K$="
 Score "
  70 PAPER 6: INK 2: PRINT : PRINT : PRI
NT : PRINT "  QUIZ GAME 1 -- PROFIT AND L
OSS"
  80 PRINT : PRINT
  90 INPUT "Hello, what is your name
    ";N$: PRINT : PRINT "Here are some p
roblems ";: IF N$<>"NO SOUND" THEN  PRIN
T N$
 100 LET P=0: LET MAX=0: LET C=0: LET W=
1
 110 LET T=1: LET I$=""
 120 LET P=P+1
 130 GO SUB 320
 140 PRINT : PRINT
 150 CLS : PRINT AT 7,0;Q$;" = ";
 160 GO SUB 740
 180 IF ABS (VAL (I$)-A)<=X AND I$<>"" T
HEN  GO TO 200
 190 GO TO 220
```

```
 200 PRINT AT 17,0;"YES, CONGRATULATIONS
": LET C=C+1: IF N$="NO SOUND" THEN  GO
TO 250
 210 BEEP .4,2: BEEP 1,5: BEEP .6,10: BE
EP .25,5: BEEP .3,5: GO TO 250
 220 IF T=1 THEN  PRINT AT 17,0;"NO, ";H
$;: FOR f=1 TO 1000: NEXT f: PRINT " TRY
 AGAIN": FOR f=1 TO 75: NEXT f: LET T=2:
 CLS : PRINT : GO TO 150
 230 PRINT AT 17,0;"SORRY, THE ANSWER IS
 = ";L$;"          ";M$
 240 PRINT j$
 260 INPUT "DO YOU WANT MORE Y/N";i$: IF
 i$="y" OR i$="Y" THEN  CLS : GO TO 110
 270 IF i$="n" OR i$="N" THEN  CLS : GO
TO 800
 310 REM
 320 REM QUESTION
 330 LET L$="": LET M$="": LET J$="": LE
T B=40: LET X=1
 340 LET E=INT (RND*8)+1: LET F=INT (RND
*90)+10: LET E$=STR$ (E): LET F$=STR$ (F
)
 350 LET W=-W
 360 IF W=1 THEN  GO TO 430
 370 LET R$="If a shopkeeper buys chocol
ate  for "+F$+" pence and sells them for
 "+STR$ (E+F)+" pence. His profit as a
     percentage of his cost price"
 380 LET Q$=R$: GO SUB 530
 390 LET H$="Percentage profit =
 ((sell - cost)/cost)x100% where sell =
selling price and cost = cost price"
 400 LET A=INT (E/F*100): LET A$=STR$ (A
)
 410 LET L$=A$+" %"
 420 LET M$="as (("+STR$ (E+F)+" - "+F$+
")/"+F$+")x100% = "+STR$ (INT (E/F*100))
 430 IF W+-1 THEN  GO TO 520
 440 LET V=INT (E*100): LET V$=STR$ (V)
```

```
 450 LET R$="A dealer wishes to make a p
rofitof "+F$+"%. If the car cost him
 "+V$+" then his selling price mustbe"
 460 LET Q$=R$: GO SUB 530
 470 LET H$="find the profit in money
 terms, then add it to the cost  price"
 480 LET A=INT (V+(F*E)): LET A$=STR$ (A
): LET Y$=STR$ (INT (F*E))
 490 LET L$="'"+A$
 500 LET M$="as profit=("+F$+"/100)x"+V$
+"="+Y$
 510 LET J$="so selling price= "+V$+"+"+
Y$+"="+1$
 520 RETURN
 530 REM fitin
 540 LET LF=LEN (R$): IF LF<=B THEN  GO
TO 620
 550 FOR I=1 TO INT (LF/40)
 560 LET EL=B*I
 570 IF FN e$(R$,el,1)="" THEN  GO TO 61
0
 580 IF FN e$(R$,el+1,1)="" THEN  LET R$
=FN z$(r$,el)+FN v$(r$,lf-el-1): LET lf=
lf-1: GO TO 610
 590 FOR k=1 TO 30: IF FN e$(r$,el-k,1)=
" " THEN  LET r$=FN z$(r$,el-k)+FN v$(s$
,k)+FN v$(r$,lf-el+k): LET lf=lf+k: GO T
O 610
 600 NEXT K
 610 NEXT I
 620 RETURN
 630 STOP
 640 REM CALC
 650 INPUT z$: IF z$="?" THEN  PRINT AT
15,0: PAUSE 0: RETURN
 660 PRINT AT 21,0;,,;AT 21,0;(INT ((VAL
 z$)*100)/100): GO TO 650
 740 REM KEYIN
 750 LET X=1
 760 LET P$(x)=INKEY$: IF P$(x)=" " THEN
  INK 2: PAPER 7: PRINT AT 0,1;"  ";C$;M
```

```
AX;K$;C: INK 3: PAPER 6: GO TO 760
 761 PRINT AT 21,0;,,;AT 21,0;: FOR i=1
TO x: PRINT p$(i);: NEXT i
 762 IF CODE p$(x)=12 THEN  LET p$="
      ": LET x=1: PRINT AT 21,0;p$: GO T
O 760
 765  IF p$(x)="?" THEN  LET p$(x)=" ":
GO SUB 640: GO TO 760
 770 IF CODE p$(x)=13 THEN  LET p$(x)="
": GO TO 780
 772 IF p$(x)<>"1" AND p$(x)<>"2" AND p$
(x)<>"3" AND p$(x)<>"4" AND p$(x)<>"5" A
ND p$(x)<>"6" AND p$(x)<>"7" AND p$(x)<>
"8" AND p$(x)<>"9" AND p$(x)<>"0" THEN
LET p$(x)=" ": GO TO 760
 775 LET x=x+1: GO TO 760
 780 LET i$="": FOR i=1 TO x-1: LET i$=i
$+p$(i): NEXT i
 790 RETURN
 800 REM score
 810 PRINT AT 7,0;"Number of problems co
mpleted=";p;AT 8,0;"Number correct=";c;A
T 11,0;n$;"'s success rate=";INT (c/p*10
0);"%": IF c>max THEN  LET max=c: LET p=
0: LET c=0: INPUT "play again? (Y/N)";i$
: IF i$="Y" OR i$="y" THEN  GO TO 110
 820 NEW
```

STATS PAINTER



You are the director of Rockets Unlimited, and yesterday you were very pleased in the way the company was going. Then these officious accountants came, studied the figures and reckoned you were making a loss.

All weekend the sales figures are preying on your mind. Even while you are painting the fence you are trying to find out where the accountants went wrong. Sometimes you get so lost in thought that you end up painting the bird on the fence. If you can work accurately and quickly, you will find out where the accountants went wrong, and you will be able to prove to them that Rockets Unlimited is the success you always knew it was.

How to play

The questions are on the modes or medians of a given set of numbers. The mode of a set of numbers is the number occurring most frequently. The median of a set of numbers is the middle number. The numbers are arranged in ascending order. Just key in the answer without pressing RETURN.

If you are right you may move on to the next question by pressing RETURN. If you are wrong, or take too long to answer, the bird ends up by getting painted. After nine consecutive correct answers you find out where the accountants went wrong.

Programming hints

If you wish to use the graphics but to set different types of questions, replace routines at lines 400, 590 and 640. Assign the question to Q$ and the answer to A$ and the hint to H$. Questions in this program must have answers one digit or letter long.

Program

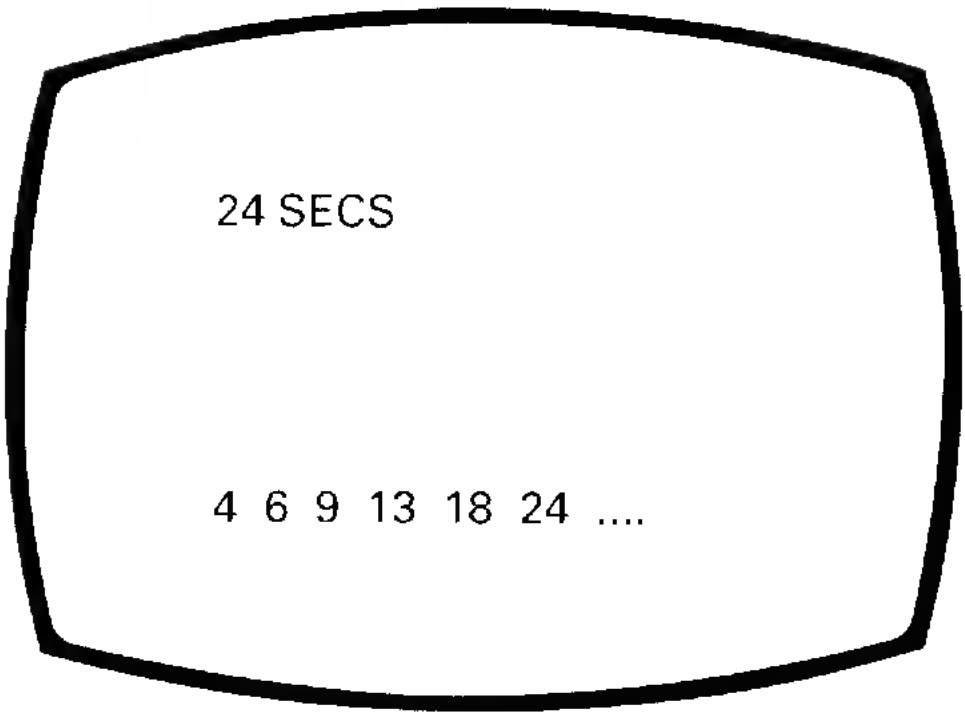
```
 10 REM stats painter
 20 REM ?
 30 REM
 40 DIM n$(5): DIM d(15): DIM c(5)
 50 PAPER 4: CLS
 60 REM  GO TO 190
 70 REM
 90 DEF FN x$(d$,n)=d$( TO n)
 95 DIM g(10)
100 DEF FN b$(n$,n,n)=n$(n TO n)
160 REM
```

```
 170 REM bird shape
 180 REM
 190 FOR k=0 TO 7
 200 READ r: POKE USR "p"+k,r
 210 NEXT k
 220 DATA 48,248,60,30,14,11,9,8
 230 REM draw fence
 238 FOR m=1 TO 9
 239 INK 0: PAPER 4: BORDER 2
 240 LET r=16: LET z=56: LET y=71
 245 FOR x=7 TO 223 STEP 24
 250 PLOT x,y: DRAW r,0: DRAW 0,z: DRAW
-r,0: DRAW 0,-z: NEXT x
 260 IF x<>247 THEN  GO TO 250: GO TO 27
0
 265 FOR p=0 TO 223 STEP 24: LET o=79: L
ET u=87: LET t=111: LET e=119
 266 IF p<>247 THEN  PLOT p,o: DRAW 7,0:
 PLOT p,u: DRAW 7,0: PLOT p,t: DRAW 7,0:
 PLOT p,e: DRAW 7,0:
 267 IF p<>240 THEN  NEXT p: GO TO 266:
IF p=264 THEN  STOP
 270 PRINT AT 5,20;"?"
 280 GO SUB 400
 285 REM print question and check answer
 290 PRINT AT 15,0;q$
 300 LET i=0: LET i$="": LET id=0
 309 GO TO 710
 320 IF i$=a$ AND id=0 THEN  PRINT "Yes,
 you are right": GO TO 360
 330 IF i<200 THEN  PRINT i$;: GO TO 725
 340 REM  FOR j=1 TO 3: BEEP 1,10: BEEP
.4,23: BEEP .2,15: NEXT j
 350 PRINT AT 18,0;"No, ";h$: GO TO 360
 355 PRINT AT 18,0;"Too late, ";h$
 360 PRINT AT 21,0;"Press enter for more
";: INPUT r$: CLS
 370 IF i$<>a$ THEN  GO TO 230
 380 NEXT m
 390 PRINT AT 15,0;"Eureka! you found it
```

```
. Get on the phone quick": GO TO 810
 400 REM stat
 410 LET mc=0: LET dn=1: LET mo=0: LET w
=INT (RND*2)+1
 420 FOR i=1 TO 5
 430 LET c(i)=INT (RND*4): IF c(i)=mc TH
EN  GO TO 430
 440 IF c(i)>mc THEN  LET mc=c(i): LET m
o=1
 450 IF c(i)=0 THEN  GO TO 500
 460 FOR l=dn TO dn+c(i)-1
 470 LET d(l)=i
 480 NEXT l
 490 LET dn=dn+c(i)
 500 NEXT i
 510 IF dn/2=INT (dn/2) THEN  LET dn=dn+
1: LET d(dn)=6
 520 LET d$="": FOR i=1 TO dn: LET d$=d$
+STR$ (d(i))+",": NEXT i: LET d$=FN x$(d
$,(dn*2)-1)
 530 LET t$="th": LET m=INT (dn/2)+1: IF
 m=1 THEN  LET t$="st"
 540 IF m=2 THEN  LET t$="nd"
 550 IF m=3 THEN  LET t$="rd"
 560 IF w=1 THEN  GO SUB 590
 570 IF w=2 THEN  GO SUB 640
 580 RETURN
 590 REM calculate mode
 600 LET q$="What is the mode of "+d$
 610 FOR f=1 TO 10: LET g(f)=0: NEXT f:
LET r=0: LET e=0
 611 FOR f=1 TO LEN d$ STEP 2: LET g(VAL
 (d$(f))+1)=g(VAL (d$(f))+1)+1: NEXT f
 612 FOR f=1 TO 10: IF g(f)>r THEN  LET
e=f-1: LET r=g(f)
 613 NEXT f
 614 LET a$=STR$ (e)
 620 LET h$="there are more "+a$+"s"
 630 RETURN
 640 REM calculate median
```

```
 650 LET q$="What is the median of "+d$
 660 LET a=d(1+INT (dn/2)): LET a$=STR$
(a)
 670 LET h$=a$+" is middle no."
 680 RETURN
 690 STOP
 700 REM paint fence
 710 FOR x=7 TO 223 STEP 24
 720 FOR y=71 TO 127: LET r=16
 725 IF INKEY$<>"" THEN  LET i$=INKEY$:
PAUSE 25: GO TO 320
 730 INK 7: PLOT x,y: DRAW r,0: NEXT y:
NEXT x
 750 PRINT  INK 7;AT 5,28;"?": BEEP .1,1
0: BEEP .4,20: BEEP .2,14: BEEP .75,10
 760 GO TO 355
```

SEQUENCE COUNTDOWN



Six numbers, or letters, will be displayed on the screen and it is up to you to provide the next logical item to complete the series.

How to play

When you have worked out your answer, type in your item and press RETURN.

A wrong answer will bring you the correct result from your computer, and then you will be handed back to the next sequence. If you wish to PASS on a question then press P and RETURN and you will be taken on to the next question.

After 11 attempts your score sheet will be displayed showing the number of sequences tried, correct answers, your time, and your IQ level for adaptibility.

Programming hints

One change you could make, is to add new sequences. To do this allow W to have a larger maximum value in line 170. The sequence must then be defined after line 210. The sequence is held in S(2), S(3), S(4), S(5), S(6), S(7) and S(8). S(2) is defined in line 150 and is fixed for all sequences. IC is another random value which may be useful when defining a sequence. The message saying how the sequence is created is held in MS$. If the last number in sequence S(8) is less than 26 then the sequence is converted to letters.

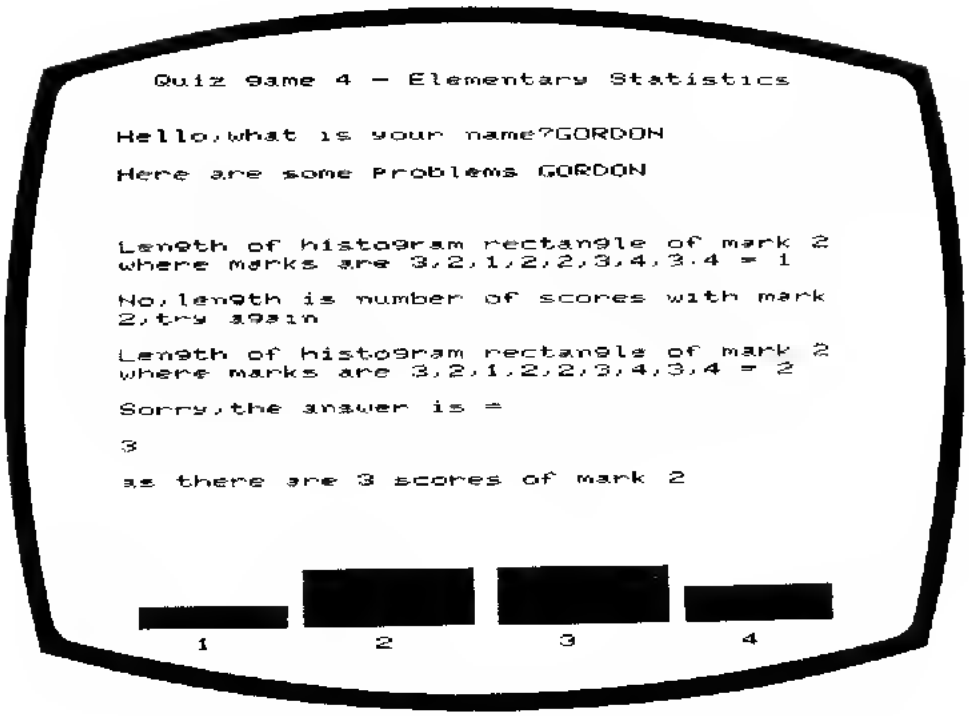
Program

```
  10 REM sequence countdown
  20 REM ?
  30 REM
  40 DIM S(8): DIM P$(255)
  50 CLS
  60 GO SUB 600
  70 LET TE=0: LET CR=0
  80 CLS
  85 PRINT AT 0,6;"SEQUENCE COUNTDOWN"
  86 PRINT AT 3,1;"What is the next numb
er in the  sequence?"
  90 LET TE=TE+1
 100 IF TE=11 THEN  GO TO 510
 110 REM
 120 REM work out sequence
 130 REM
 140 LET S(1)=0
```

```
 150 LET S(2)=INT (RND*9)+1
 160 LET IC=INT (RND*9)+1
 170 LET W=INT (RND*3)
 180 FOR I=3 TO 8
 190 IF W=0 THEN  LET S(I)=2*S(I-1)-S(I-
2)+IC: LET M$="The interval increases by
 "+STR$ (IC)+" each time"
 200 IF W=1 THEN  LET S(I)=S(I-1)+S(I-2)
+IC: LET M$="Each number is the sum of t
he   previous two plus "+STR$ (IC)
 210 IF W=2 THEN  LET S(I)=S(2)^(I-1): L
ET M$="Each number is "+STR$ S(2)+" to t
he power of 1,2,3,4,5,6 and 7"
 220 NEXT I
 230 FOR I=1 TO 13: PRINT : NEXT I
 240 REM
 250 REM display sequence
 260 REM
 270 IF S(8)>26 THEN  PRINT AT 8,1;STR$
(S(2));" ";STR$ (S(3));" ";STR$ (S(4));"
 ";STR$ (S(5));" ";STR$ (S(6));" ";STR$
(S(7));".....";: LET LE=0
 280 IF S(8)<=26 THEN  LET LE=1: PRINT C
HR$ (64+S(2));" ";CHR$ (64+S(3));" ";CHR
$ (64+S(4));" ";CHR$ (64+S(5));" ";CHR$
(64+S(6));" ";CHR$ (64+S(7));" .......";
 290 REM
 300 REM input answer
 310 REM
 320 LET I=0
 350 LET I$="": FOR A=1 TO I-1: LET I$=I
$+P$(A): NEXT A
 360 REM
 370 REM check answer
 380 REM
 390 INPUT D$
 400 IF LE=0 AND VAL (D$)-S(8)=0 THEN  I
NK 2: PRINT " ";"?": LET CR=CR+1: INK 4:
 GO TO 450
 405 IF LE=0 THEN  GO TO 440
```

```
 410 IF LE=1 AND D$=CHR$ (64+S(8)) THEN
 INK 2: PRINT " ";"?": LET CR=CR+1: INK
4: GO TO 450
 420 PRINT : PRINT : PRINT "no the answe
r =";S(8)
 430 IF LE=1 THEN  PRINT : PRINT "Replac
e each letter by its position number e.g
.1 for A, 2 for B etc."
 440 PRINT : PRINT M$
 450 PRINT : PRINT "Press ENTER to conti
nue"
 460 INPUT B$
 470 GO TO 80
 480 REM
 490 REM SCORE SHEET
 500 REM
 510 CLS : PRINT
 520 PRINT "Number of sentences complete
d =";TE
 530 PRINT : PRINT "Number correct =";CR
 550 LET IQ=INT (CR*100/53)
 560 PRINT : PRINT "Your IQ level (adapt
ability) =";IQ
 570 PRINT
 580 IF CR>=7 THEN  PRINT "THIS IS CLASS
ED AS SUPERIOR (UPPER 10%)": STOP
 585 IF CR=6 THEN  PRINT "THIS IS CLASSE
D AS GOOD (UPPER 20%)": STOP
 590 IF CR=5 THEN  PRINT "THIS IS CLASSE
D AS FAIR (UPPER 60%)": STOP
 595 STOP
 600 FOR N=0 TO 7
 610 READ R: POKE USR "P"+N,R
 620 DATA 0,0,1,2,4,136,80,32
 630 NEXT N
 640 RETURN
```

ELEMENTARY STATISTICS



Could you draw a bar chart (histogram) of a given set of numbers?

Could you understand a bar chart which someone else had written? Here you can test your knowledge on bar charts and means by answering as many questions on these subjects as possible, in five minutes.

This program has an added feature which is that the bar chart will be drawn, by the computer, at the end of the problem. In addition an explanation will be provided.

How to play

You will be given five minutes to answer as many questions as possible, and you may press P and RETURN for pass if you cannot work out an answer.

You will not be penalised for 'passes'.

At the end of five minutes, or sooner if you enter N for NO in answer to the question "do you want any more", your score sheet showing tries, correct answers and average time per answer will appear. If you wish to proceed then press Y and RETURN and the program will continue to ask you questions.

You can have two tries at each question if you wish. After the first attempt you will be given a hint as to the correct answer. If your second answer is wrong you will be told the solution and how it was obtained.

If you cannot work out an answer then press ? and RETURN and your computer will turn into a calculator and you can then use the normal mathematical symbols on the keyboard. Do not type = at the end of your calculation. For the calculator's answer press RETURN. To return to the main game press ? and RETURN. Always remember to press RETURN after each required response.

Programming hints

The box chart is drawn using solid squares. These are user defined characters with all the pixels filled in and are created at the beginning of the program using VDU 2 3. The bar chart is held in N(0) and N(1). The number of each of the marks are held in the array F and the bar chart is drawn from this.

You could increase the number of scores. To do this you must increase the maximum value of J in line 260. The array D would have to be reDIMensioned in line 30. Remember also, if more scores are used then the sum or the marks must be divided by a number larger than 9 in line 340 to get the correct mean value.

The maximum number of any particular mark would also be greater than 9 so the maximum value of I in line 500 would have to increased.

Program

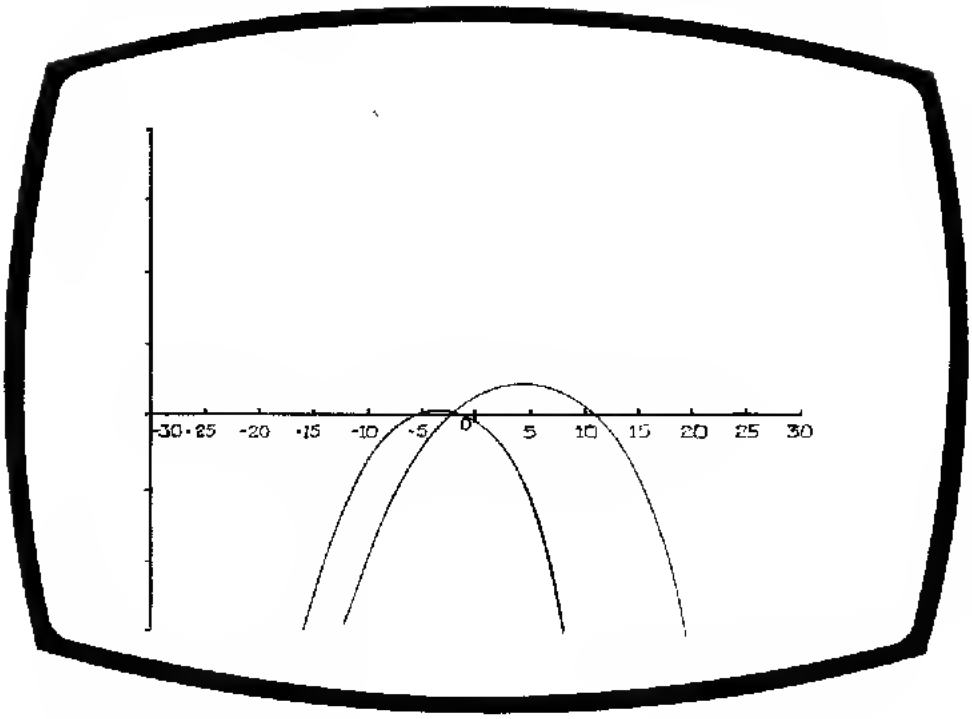
```
  10 REM elementary stats
  20 REM ?
  25 LET max=0
  30 DIM F(4): DIM D(9): DIM N$(5)
  40 DEF FN O$(G$,n)=G$( TO n)
  50 LET S$="                              "
  51 LET v=0: LET y=0
  52 LET Y$="Highest score ": LET K$="
  Score "
  60 PAPER 7: INK 0: PRINT : PRINT "QUIZ
 GAME 4 ELEMENTARY              STATISTICS"
  70 PRINT : PRINT
  80 INPUT "Hello, what is your name?
    ";A$: PRINT : PRINT "Here are some p
roblems for you  ";A$
  90 LET W=1: LET C=0: LET T=1: LET I$="
": LET P=0
 100 LET P=P+1
 110 GO SUB 252
 120 PRINT : PRINT
 125 CLS
 130 PRINT AT 5,0;Q$;" = ": GO SUB 612
 136 IF v=2 THEN  LET p=p-1: GO TO 200
 142 IF A=0 AND I$<>"0" THEN  GO TO 190
 145 IF i$=I$ THEN  GO TO 170
```

```
 150 IF (ABS (VAL (I$)-A)<=x) AND I$<>""
 THEN  GO TO 170
 160 GO TO 190
 170 PAPER 7: INK 0: PRINT AT 3,0;"Yes,
congratulations                ": LET C=C+1:
 PRINT : IF a$="NO SOUND" THEN  GO TO 22
0
 180 BEEP .1,10: BEEP .4,20: BEEP .6,14:
 BEEP 2,16: GO TO 230
 190 IF T=1 THEN  PRINT AT 13,0;"No, ";H
$;", try again             ";: PAUSE 0: PAU
SE 0: LET T=2: GO TO 130
 200 PRINT "Sorry, the answer is = ";: P
RINT L$: PRINT M$
 210 PRINT AT 21,0;"          0     1
2     3  "
 215 FOR j=1 TO 4: LET h=20: FOR k=20 TO
 (20-d(j)) STEP -1: PRINT AT h,j*6;"????
?": LET h=h-1: NEXT k: NEXT j
 230 INPUT "Do you want more? Y/N";i$
 240 IF I$<>"" AND I$<>"Y" AND i$<>"y" A
ND i$<>"n" AND I$<>"N" THEN  GO TO 230
 250 IF I$="Y" OR I$="y" THEN  LET T=1:
CLS : GO TO 100
 251 GO TO 670
 252 REM QUESTION
 260 LET L$="": LET M$="": LET N$(1)=" "
: LET N$(2)=" ": LET S=0: LET F(1)=0: LE
T F(2)=0: LET F(3)=0: LET F(4)=0: LET G$
=" ": FOR J=1 TO 9
 270 LET D(J)=INT (RND*4): LET G$=G$+STR
$ (D(J))+",": LET S=(S+D(J))
 280 FOR K=0 TO 3: IF D(J)=K THEN  LET F
(K+1)=F(K+1)+1
 290 NEXT K: NEXT J: LET W=-W: LET G$=FN
 O$(G$,18)
 300 LET Z$=" where values are "+G$
 310 IF W=1 THEN  LET X=0
 320 IF (S/9)=INT (S/9) THEN  GO TO 380
 330 LET INC=9*INT (S/9)+9-s
 340 LET d(9)=d(9)+inc
```

```
 350 LET g$=FN o$(g$,16)+","+STR$ (d(9))
 360 LET s=s+inc
 370 LET Q$="Mean value scored where val
ues  are "+G$
 380 LET H$="mean=total values scored
 divided by number of scores": LET A=INT
 (S/9)
 390 LET L$=STR$ (A)+" as sum of ("+G$+"
)/9 = "+STR$ (A)
 400 IF W=1 THEN  LET M$="": GO TO 510
 410 LET X=0: LET P$=STR$ INT ((RND*4)):
 LET A=F(VAL (P$)+1)
 420 LET Q$="Height of histogram rectang
le   of value "+P$+Z$
 430 LET H$="Height is number of scores
 with value "+P$+" "
 440 LET L$=STR$ (A): LET M$="as there a
re "+STR$ (A)+" scores of value "+P$: IF
 A=0 THEN  LET M$="as there is 1 score o
f value "+P$
 450 LET N$(1)="": LET N$(2)=""
 460 FOR I=9 TO 1 STEP -1: FOR K=1 TO 4
 470 IF F(K)>=I THEN  LET N$(ABS (INT (I
/5)+1))=N$(ABS (INT (I/5)+1))+" "
 480 IF F(K)<I THEN  LET N$(INT (I/5)+1)
=N$(INT (I/5)+1)+"          "
 490 NEXT k: NEXT i
 500 LET N$(1)=N$(1)+"     1     2     3
     4"
 510 RETURN
 612 REM KEYIN
 620 LET G=1: LET VP=21: LET HP=0
 625 PRINT  PAPER 0; INK 7;AT 1,0;"   ";
Y$;MAX;K$;C
 630 LET 0$=INKEY$: IF 0$<>"" THEN  GO T
0 640
 632 LET y=y+1: IF y=8200 THEN  LET p=p-
1: GO TO 670
 634 GO TO 630
 640 IF CODE o$=112 OR CODE o$=80 THEN
LET v=2: RETURN
```

```
 650 IF CODE o$=63 THEN  GO SUB 8000: PA
USE 0: GO TO 630
 655 LET i$=o$
 660 RETURN
 670 REM SCORE
 680 CLS
 700 PRINT "Number of problems completed
 = ";INT P
 710 PRINT : PRINT "Number correct = ";I
NT C
 740 IF C>MAX  THEN  LET MAX=C
 750 LET P=0: LET C=0
 760 INPUT "again? (y/n)";b$: IF b$<>"Y"
 AND b$<>"y" THEN  NEW
 770 GO TO 30
8000 INPUT u$: IF u$="?" THEN  PRINT AT
21,0;,,: RETURN
8001 PRINT AT 21,0;,,;AT 21,0;VAL u$: GO
 TO 8000
9999 REM
```

NAME THE GRAPH



This is a game of logic. You have an aim, to find the equation of the graph that is drawn on the screen. You key in numbers to represent an equation. You can see straight away whether you are getting closer to your goal as the graph of the equation you keyed in is drawn on the screen.

By making the three numbers required larger and smaller, positive and negative, you can see how it effects the graph and hopefully, you can watch your graph getting closer and closer to the target graph until you hit it.

If you give up you will be told the answer, but don't cheat.

How to play

All graphs drawn are of the type

$$y = Ax^2 + Bx + C$$

Where A, B and C are constants (that is numbers that can be positive or negative). For example, the equation might be

$$y = -2x^2 + 3x - 5$$

and in this case A would be equal to -2, B equal to 3 and C to -5.

You must key in three numbers all at once on the same line and separated by commas. Press RETURN only after you have keyed in all three numbers. In the example above you would key in

-2, RETURN, 3, RETURN, -5 then RETURN

Then the graph of this expression is drawn and you must make another guess. If you cannot guess the answer key in

WHAT, ENTER, IS, ENTER, IT then RETURN

and you will be given the answer and the program ends.

If you guess the answer correctly then press the escape key and a new graph will be drawn.

It is more fun if you find out how to do it by trial and error, but if you want a hint to get you started then this is it. (Skip the next paragraph if you do not want to know)

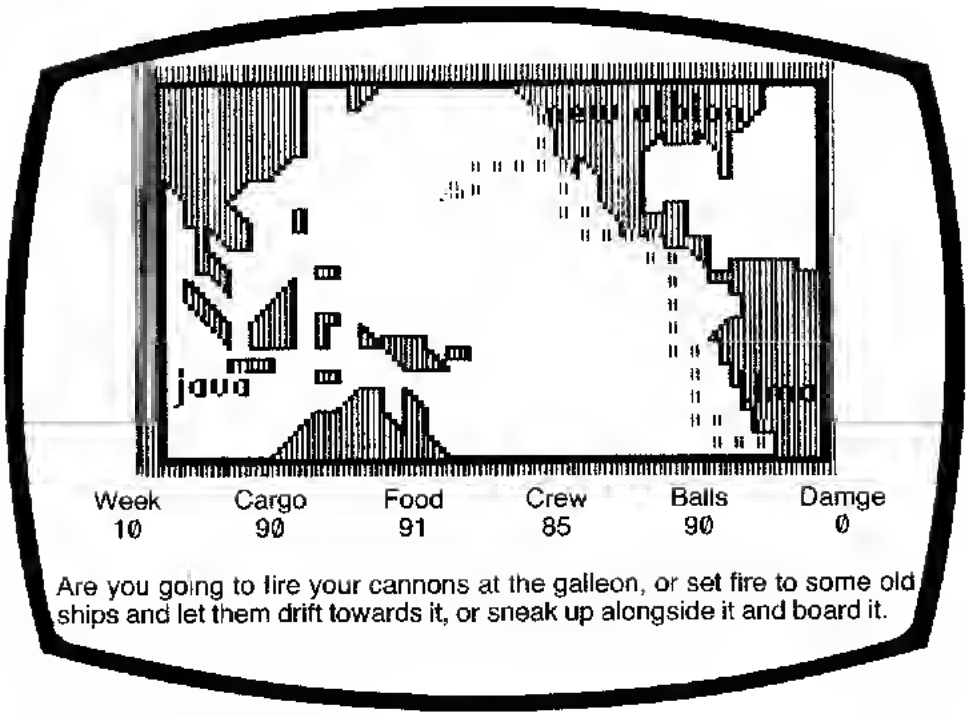
If the first number (A) is positive, the graph will point upwards (u shape), and if it is negative the graph will point downwards (n shape).

Program

```
  10 REM name the graph
  20 REM ?
  30 REM
  40 OVER 1: BORDER 2: PAPER 5: INK 0: C
LS
  59 REM
  60 REM draw axes
  61 REM
  70 FOR f=0 TO 7
  80 READ r: POKE USR "p"+f,r
  85 READ e: POKE USR "o"+f,e
  90 NEXT f
  98 DATA 30,0,16,128,16,128,16,128,16,2
55,16,0,16,0,16,0
 100 FOR x=0 TO 21 STEP 1: PRINT AT x,0;
"?": NEXT x
 110 FOR x=0 TO 31 STEP 1: PRINT AT 11,x
;"?": NEXT x
 120 REM
 130 REM draw target graph
 140 REM
 150 LET a=INT (2*RND+1.1): LET d=INT (5
*RND+2.1)
 160 LET c=INT (RND*20)
 170 FOR H=1 TO (RND*4)+1: LET a=a*-1: L
ET d=d*-1: LET c=c*-1: NEXT H
 180 LET p=a: LET q=d: LET r=c
 190 INK 0
 195 LET AA=A: LET BB=D: LET CC=C
 200 GO SUB 1000
 210 REM
 220 REM input and draw guessed graph
 230 REM
```

```
 240 LET g=0
 245 LET G=G+1: IF G=11 THEN  CLS : PRIN
T "THE ANSWER WAS ;";A;",";D;",";C;"
       AGAIN?  (Y/N)": INPUT Q$: IF Q$<>
"Y" AND Q$<>"y" THEN  NEW
 246 IF g=11 THEN  RUN
 250 IF g<>1 THEN  PRINT AT 0,0; OVER 0;
"Guess ";g;" Last guess = ";a$;",";b$;",
";c$: INPUT A$;B$;C$: GO TO 270
 255 PRINT AT 0,0; OVER 0;"  Y=AX^2+BX+C
 GUESS;A;B;C"
 260  INPUT a$;b$;c$
 270 IF a$="WHAT" AND B$="IS" AND C$="IT
" THEN  LET g=10: GO TO 245
 280 LET J=VAL A$: LET K=VAL B$: LET L=V
AL C$
 295 LET AA=J: LET BB=K: LET CC=L
 300 GO SUB 1000
 305 IF J=A AND K=D AND L=C THEN  CLS :
PRINT "CORRECT": FOR F=0 TO 300: NEXT F:
 GO TO 1
 310 PRINT AT 0,0; OVER 0;"  PLEASE WAIT
                    ": INK 8: GO SUB 1000:
 INK 0
 320 GO TO 250
1000 REM
1010 REM graph
1020 REM
1040 FOR x=0 TO 252 STEP 3
1050 LET y=(AA*X^2)/400+(AA*BB*X)/10+CC+
83
1060 IF y>167 OR y<0 THEN  NEXT x: GO TO
 1100
1090 PLOT x,y
1095 NEXT x
1100 RETURN
9999 PRINT (AA*X^2)
```

FRANCIS DRAKE ADVENTURE GAME



This is by far and away the most ambitious, interesting and testing program in this book.

This is an authentic historical adventure game based on Francis Drake's circumnavigation of the world, from 1577 to 1580. As you travel in the footsteps of the greatest of Elizabeth the First's free-booting adventurers, you will encounter the same problems and challenges as Drake.

Drake sailed in search of the elusive North West Passage that would allow him access to the Pacific, and the galleons of the Spanish Empire. As history books will already have told you, he did not find the object of his quest, but he did find much more, and so will you as you sail into the Francis Adventure Game.

How to play

First you will hear the gentle lapping of waves against the shore and you will see title. Then a map is displayed.

On the map you will see your position marked by a white sailing ship, docked near the port of Lima.

Everytime you use this game, the dangers and treasures will be located in different parts of the ocean, so do not think that you can predict your moves too easily. We didn't feel it was fair, however, to move the rocks and reefs during the game so try and remember their locations. It will help you considerably.

You **must** follow Drake's route by first travelling to the port known as New Albion and thence onward, past Java, to the bottom left hand corner of the map.

Your aim is to reach the bottom of the map with, at least, four times the amount of the cargo with which you began.

If you achieve this feat of daring then you will, naturally, be rewarded by the gift of a knighthood from your grateful, and avaricious, Queen.

You move using the ARROW cursor keys unshifted. That is, do **not** press the CAPS SHIFT key.

If the computer does not understand you, you will hear a beep. this also occurs when you run into a reef or rock.

At intervals you will be told the situation at sea and asked which action you would like to take, from the choice shown.

Remember to consider your options carefully as to the amounts of cargo, food, cannon balls and crew conditions.

Damage rating is based on a 1 to 10 scale. If you are damaged to the level of 10 then I'm afraid that it's into the sea for you, as the Golden Hind settles gently below your feet.

Do your best, as the present Government is emptying the coffers more quickly than you are filling them.

Hints and changes you can make

One of the problems of displaying a map on the screen, is how to reduce the memory required and the number of lines needed to describe the map. This is done here by defining a string array m, with the number of elements being equal to the number of rows on the map. Standard shapes that are not available from the keyboard are then defined. The shapes are as shown below. Each is assigned to an element of array g$.

Each row of the map is assigned to an element of m$ using the above shapes, and zero (to represent blanks).

If you find the adventure too easy, then reduce the cargo (ca), food (su), crew (cr), and/or cannon balls (ba) that you start with. They are on line 1130. If you find that knighthood escapes you, then reduce the 400 in line 1180.

Program

```
  10 REM Francis Drake Adventure Game
  20 REM Copyright (C) G.Ludinski 1983
  30 BORDER 0: PAPER 2: CLS : INK 7
  40 LET title=2550: LET sea=2670
  50 DATA 33,0,0,14,0,22,34,126,230,24,2
11,254,65,16,254,35,21,32,244,12,32,239,
201
  70 GO SUB title
  72 GO SUB sea
  80 DIM m$(17,32): DIM g$(9,1)
  90 BORDER 1: PAPER 1: INK 4: CLS
 100 CLS
 120 LET g$(1)=CHR$ 131
 130 LET g$(2)=CHR$ 140
 140 LET g$(3)=CHR$ 138
 150 LET g$(4)=CHR$ 133
 160 LET z1=BIN 11111110: LET z2=BIN 111
11100: LET z3=BIN 11111000: LET z4=BIN 1
1110000: LET z5=BIN 11100000: LET z6=BIN
 11000000: LET z7=BIN 10000000
 170 LET 11=BIN 01111111: LET 12=BIN 001
11111: LET 13=BIN 00011111: LET 14=BIN 0
0001111: LET 15=BIN 00000111: LET 16=BIN
 00000011: LET 17=BIN 00000001
 180 DATA "a",255,z1,z2,z3,z4,z5,z6,z7
 190 DATA "b",17,16,15,14,13,12,11,255
 200 DATA "c",255,11,12,13,14,15,16,17
 210 DATA "d",z7,z6,z5,z4,z3,z2,z1,255
 220 LET g$(9)=CHR$ 143
 230 FOR n=1 TO 4: READ p$
 240 FOR f=0 TO 7
 250 READ a: POKE USR p$+f,a
 260 NEXT f
 270 NEXT n
 280 FOR i=0 TO 3: LET g$(5+i)=CHR$ (144
+i): NEXT i
 290 LET m$(1)=" 99999930450000007999999
9999000 "
```

```
 300 LET m$(2)=" 99999930000000000799999
9995000 "
 310 LET m$(3)=" 99999930000000000099995
1730000 "
 320 LET m$(4)=" 99999500000000000077990
0030000 "
 330 LET m$(5)=" 79950000000000000000990
0000000 "
 340 LET m$(6)=" 09980030000000000000792
9000000 "
 350 LET m$(7)=" 04790000000000000000011
9200000 "
 360 LET m$(8)=" 04800002000000000000000
0702220 "
 370 LET m$(9)=" 08700600000000000000000
0019999 "
 380 LET m$(10)=" 07806902000000000000000
00004999 "
 390 LET m$(11)=" 00709903082200000000000
00069999 "
 400 LET m$(12)=" 00022000007981000000000
00049999 "
 410 LET m$(13)=" 00000001000000000000000
00009999 "
 420 LET m$(14)=" 00000000690800000000000
00004999 "
 430 LET m$(15)=" 00000069998900000000000
00000999 "
 440 LET m$(16)=" 00000699999980000000000
00000099 "
 450 FOR j=1 TO 16: PRINT CHR$ (64+j);"
";: FOR i=2 TO 31: LET p=VAL ((m$(j))(i)
): IF p=0 THEN  PRINT " ";: GO TO 470
 460 PRINT g$(p);
 470 NEXT i
 480 PRINT
 490 NEXT j
 500 PAPER 4: INK 1: PRINT AT 0,19;".New
 Albio";: PAPER 1: INK 4: PRINT "n": PAP
ER 1: INK 7: PRINT AT 14,25;"Lima";: INK
 1: PAPER 4: PRINT ".": INK 7: PAPER 1:
PRINT AT 12,2;"Java"
```

```
 520 INK 4: PAPER 1: PLOT 15,47: DRAW 24
0,0: DRAW 0,128: DRAW -23,0: PLOT 15,47:
 DRAW 0,128: DRAW 136,0
 522 PAPER 7: INK 0: PRINT AT 16,0;"Fran
cis Drake left Plymouth in  1577 to sear
ch for a North-West passage to the Pacif
ic.He        encountered stormy weather i
n   the Straits of Magellan and losttwo
ships.Then the wind dropped "
 740 LET s$="
     "
 760 LET blank=1710: LET isert=2170: LET
 instr=1490: LET reef=1570: LET namship=
1750: LET ship=1850: LET trade=2110: LET
 hostile=2140
 770 DEF FN r(n)=INT (RND*n+1)
 780 LET al=0
 800 FOR f=0 TO 7
 810 READ a
 820 POKE USR "e"+f,a
 830 NEXT f
 840 DATA BIN 00010000,BIN 01011010,BIN
01011011,BIN 01010010,BIN 01010111,BIN 1
1111110,BIN 01111110,BIN 00111110
 860 LET h$=CHR$ 148
 870 LET 1$="5": LET t$="8": LET d$="6":
 LET u$="7"
1020 LET m$(15)=" 000000699989000000000
0eeee999 "
1030 LET m$(16)=" 000006999999800000000
0eeeee99 "
1040 FOR y=1 TO 16
1050 FOR x=2 TO 31
1060 LET c$=(m$(y))(x)
1070 IF c$="9" THEN  GO TO 1120
1080 IF c$="0" THEN  LET is=INT (7*RND):
 GO SUB isert: GO TO 1120
1090 IF c$="e" THEN  LET is=4: GO SUB is
ert: GO TO 1120
1100 IF (x>4 AND x<15 AND y>7 AND y<14)
THEN  LET is=INT (2*RND+7): GO SUB isert
```

```
: GO TO 1120
1110 LET is=10: GO SUB isert
1120 NEXT x: NEXT y
1130 LET ca=100: LET su=100: LET cr=85:
LET ba=100: LET da=0: LET wk=1
1140 LET en=0
1150 LET x=29: LET y=16: LET x1=29: LET
y1=16
1160 IF wk=1 THEN  PAPER 1: INK 7: PRINT
 AT y-1,x+1;h$
1170 PAPER 6: INK 0: PRINT AT 16,0;"Week
 Cargo Food Crew Balls Damg.
                    ";
1172 IF wk=1 THEN  GO SUB blank
1180 IF x=1 AND y=16 THEN  PAPER 7: PRIN
T AT 18,0;"You have survived the unknown
   and now know you are the first  fleet
 commander to sail around  the world.";:
 IF ca>=400 THEN  PRINT "Arise Sir Franc
is": GO TO 2210
1190 IF x=1 AND y=16 THEN  LET en=1
1200 IF (x=17 AND y=1) OR (x=18 AND y=2)
 OR (x=19 AND y=4) THEN  LET a1=1
1210 IF x<15 AND a1=0 THEN  GO SUB blank
: PRINT AT 18,0;"Go back to New Albion"
1220 IF su<=0 THEN  GO SUB blank: PRINT
AT 18,0;"Your food has been used up so
 your crew mutin8ies,and kills  you": L
ET su=0: LET en=1
1230 IF cr<=0 THEN  GO SUB blank: PRINT
AT 18,0;"Your crew have all been killed
 or have died of scurvy,typhus ordysente
ry.You are stranded       without them.":
 LET cr=0: LET en=1
1240 IF da>10 THEN  GO SUB blank: PRINT
AT 18,0;"Your ship has filled with water
 and sunk": LET en=1
1250 IF ba<0 THEN  LET ba=0
1270 INK 0: PAPER 6: PRINT AT 17,0;wk;AT
 17,5;ca;AT 17,11;su;AT 17,16;cr;AT 17,2
1;ba;AT 17,27;da
```

```
1272 IF en=1 THEN  GO TO 2210
1280 LET i$=INKEY$: IF i$="" THEN  GO TO
 1280
1290 GO SUB blank
1300 IF (x=1 AND i$=l$) OR (x=30 AND i$=
t$) OR (y=1 AND i$=u$) OR (y=16 AND i$=d
$) OR (i$<>u$ AND i$<>d$ AND i$<>l$ AND
i$<>t$) THEN  GO TO 1280
1310 IF i$=l$ THEN  IF m$(y)(x-1)<>"0" A
ND m$(y)(x-1)<>"9" AND m$(y)(x)<>"2" THE
N  LET x=x-1
1320 IF i$=t$ AND (m$(y)(x+1)<>"2" AND m
$(y)(x+1)<>"9" AND m$(y)(x)<>"0") THEN
LET x=x+1
1330 IF i$=d$ AND (m$(y+1)(x)<>"3" AND m
$(y+1)(x)<>"9" AND m$(y)(x)<>"1") THEN
LET y=y+1
1340 IF i$=u$ THEN  IF (m$(y-1)(x)<>"1"
AND m$(y-1)(x)<>"9" AND m$(y)(x)<>"3") T
HEN  LET y=y-1
1350 LET wk=wk+1
1360 IF da<>0 THEN  LET da=da+1
1370 LET su=su-1
1380 PAPER 1: INK 7: PRINT AT y1-1,x1+1;
".";
1390 PRINT AT y-1,x+1;h$
1400 IF x=x1 AND y=y1 AND wk<>1 THEN  BE
EP 1,0: GO SUB reef: GO TO 1470
1410 IF m$(y)(x)="a" AND da<>0 THEN  LET
 da=0: GO SUB blank: PRINT AT 18,0;"You
have arrived at a port so   you can now
get your ship       repaired": GO TO 147
0
1420 IF m$(y)(x)="4" THEN  GO SUB blank:
 GO TO 1470
1430 IF m$(y)(x)="5" THEN  GO SUB namshi
p
1440 IF m$(y)(x)="6" THEN  GO SUB ship
1450 IF m$(y)(x)="7" THEN  GO SUB trade
1460 IF m$(y)(x)="8" THEN  GO SUB hostil
e
```

```
1470 LET x1=x: LET y1=y
1480 GO TO 1170
1490 REM instr subroutine
1500 LET p=0
1510 IF LEN r$=0 OR LEN c$>LEN r$ THEN
RETURN
1520 FOR p=1 TO LEN r$-LEN c$+1
1530 IF r$(p TO p+LEN c$-1)=c$ THEN  RET
URN
1540 NEXT p
1550 LET p=0
1560 RETURN
1570 REM reef subroutine
1580 LET w=INT (2*RND)
1590 IF x<15 THEN  LET e$="reef": GO TO
1610
1600 LET e$="rock"
1610 GO SUB blank
1620 IF w=0 THEN  PRINT AT 18,0;"There i
s a ";e$;" ahead.Turn      around": GO T
O 1700
1630 PRINT AT 18,0;"You have run aground
 on a ";e$;". Are you going to throw car
go andguns overboard,or put out an    an
chor to windward"
1640 POKE 23658,0: INPUT r$: LET c$="ove
rboard": GO SUB instr: IF p<>0 THEN  LET
 r$=c$: GO TO 1670
1650 LET c$="anchor": GO SUB instr: IF p
<>0 THEN  LET r$=c$: GO TO 1670
1660 BEEP 1,0: GO TO 1640
1670 IF r$="overboard" THEN  GO SUB blan
k: LET ca=ca-FN r(20): GO TO 1700
1680 LET w2=INT (2*RND): GO SUB blank: I
F w2=0 THEN  PRINT AT 18,0;"You have bro
ken free without anysignificant damage":
 GO TO 1700
1690 PRINT AT 18,0;"Your ship,the Golden
 Hind,is    holed.Return to dry land at
onceor it will sink":: LET da=da+1
1700 RETURN
```

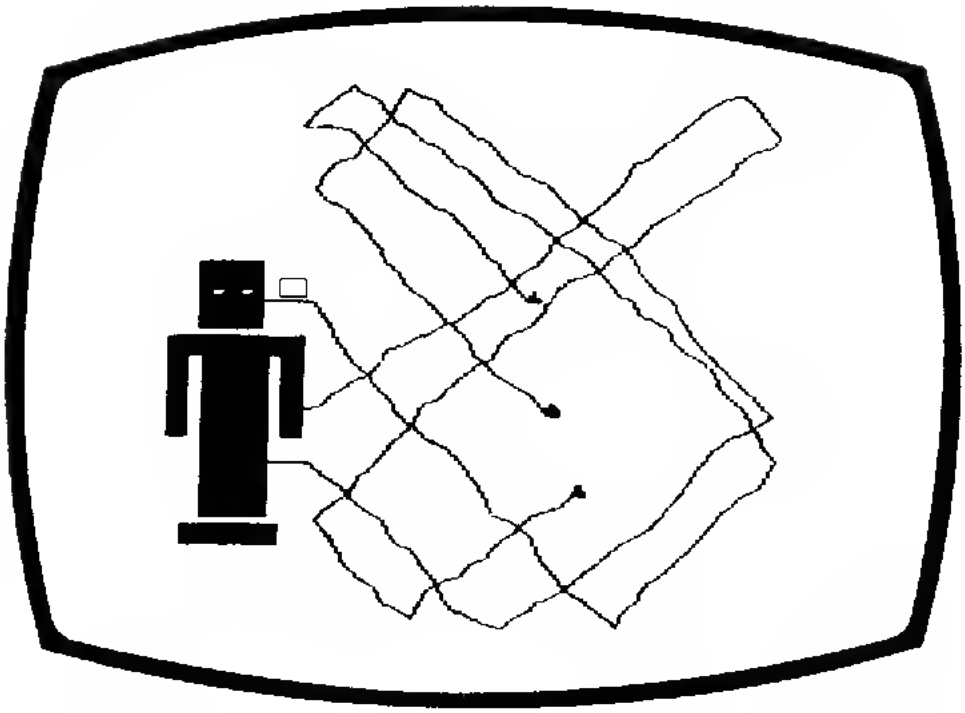
```
1710 REM blank subroutine
1720 PAPER 7: PRINT AT 18,0;s$;s$;s$;s$;
1730 INK 0
1740 RETURN
1750 REM namship subroutine
1760 GO SUB blank
1770 IF RND>0.5 THEN  PRINT AT 18,0;"You
 see a Spanish galleon,the  Cacafuego.A
re you going to      attack it or ignore
 it": GO TO 1790
1780 PRINT AT 18,0;"You see a Spanish ga
lleon,the  Esprito Santo.Are you going
to  attack it or ignore it": GO TO 1790
1790 POKE 23658,0: INPUT r$: LET c$="att
ack": GO SUB instr: IF p<>0 THEN  LET r$
=c$: GO TO 1820
1800 LET c$="ignore": GO SUB instr: IF p
<>0 THEN  LET r$=c$: GO TO 1820
1810 BEEP 1,0: GO TO 1790
1820 IF r$="attack" AND ba<=0 THEN  GO S
UB blank: PRINT AT 18,0;"You draw alongs
ide the galleon  and then find you have
no cannonballs left,so the Spanish win
 the battle and leave you to die": LET e
n=1: GO TO 1840
1830 IF r$="attack" THEN  GO SUB blank:
PRINT AT 18,0;"You fight a fierce battle
 and   finally take command of the     g
alleon and transfer its cargo  to the ho
ld of your ship": LET ca=ca+FN r(20): LE
T ba=ba-FN r(20)
1840 RETURN
1850 REM ship subroutine
1860 GO SUB blank
1870 PRINT AT 18,0;"You see a Spanish ga
lleon.Are   you going to attack it or ig
noreit"
1880 POKE 23658,0: INPUT r$: LET c$="att
ack": GO SUB instr: IF p<>0 THEN  LET r$
=c$: GO TO 1910
1890 LET c$="ignore": GO SUB instr: IF p
```

```
<>0 THEN  LET r$=c$: GO TO 1910
1900 BEEP 1,0: GO TO 1880
1910 IF r$="ignore" THEN  RETURN
1920 GO SUB blank
1930 PRINT AT 18,0;"Are you going to fir
e cannons atthe galleon,or set fire to s
ome old ships and let them drift to-ward
s it,or sneak up & board it"
1940 POKE 23658,0: INPUT r$: LET c$="can
non": GO SUB instr: IF p<>0 THEN  LET r$
=c$: GO TO 1980
1950 LET c$="set fire": GO SUB instr: IF
 p<>0 THEN  LET r$=c$: GO TO 1980
1960 LET c$="sneak": GO SUB instr: IF p<
>0 THEN  LET r$=c$: GO TO 1980
1970 BEEP 1,0: GO TO 1940
1980 GO SUB blank
1990 IF r$<>"cannon" THEN  GO TO 2020
2000 IF RND>0.5 THEN  PRINT AT 18,0;"You
r ship gets holed and some ofyour crew a
re shot.Return to dryland at once": LET
da=da+1: LET ba=ba-FN r(20): LET cr=cr-F
N r(10): GO TO 2020
2010 PRINT AT 18,0;"As your ship is smal
ler and      lower than the galleon,you
    manage to put it out of action  and
board it": LET ca=ca+FN r(20): LET su=su
+FN r(20): LET ba=ba+FN r(20)
2020 IF r$<>"set fire" THEN  GO TO 2060
2030 GO SUB blank
2040 IF RND>0.5 THEN  PRINT AT 18,0;"The
 wind changes direction and  the burning
 ships towards your  ship setting the mi
zzen mast    alight.Return to port at on
ce": LET da=da+1: GO TO 2060
2050 PRINT AT 18,0;"The burning ships dr
ift towards the galleon setting it aligh
t.  The captain surrenders and you  tran
sfer his cargo to your hold": LET ca=ca+
FN r(20): LET su=su+FN r(20): LET ba=ba+
FN r(20): GO TO 2060
```

```
2060 IF r$<>"sneak" THEN  GO TO 2100
2070 GO SUB blank
2080 IF RND>0.5 THEN  PRINT AT 18,0;"The
y see you approaching and    open fire,s
hooting some of your crew and damaging y
our ship.    Return to port at once": LE
T ba=ba-FN r(20): LET da=da+1: LET cr=cr
-FN r(10): GO TO 2100
2090 PRINT AT 18,0;"They assume you are
Spanish as  English ships have never bee
n   this far before,so you board thegall
eon and capture it": LET ca=ca+FN r(20):
 LET su=su+FN r(20): LET ba=ba+FN r(20)
2100 RETURN
2110 REM trade subroutine
2120 GO SUB blank: PRINT AT 18,0;"You bu
y cloves cheaply from the islanders": LE
T ca=ca+FN r(20): LET su=su+FN r(20)
2130 RETURN
2140 REM hostile subroutine
2150 GO SUB blank: PRINT AT 18,0;"Hostil
e islanders pelt you with stones killing
 some of your crew": LET cr=cr-FN r(20)
2160 RETURN
2170 REM isert subroutine
2180 IF is<>10 THEN  LET m$(y)(x)=STR$ i
s: GO TO 2200
2190 LET m$(y)(x)="a"
2200 RETURN
2210 STOP
2550 REM title subroutine
2560 CLS
2570 FOR i=1 TO 9: PRINT : NEXT i
2580 PRINT "          FRANCIS DRAKE": PRI
NT : PRINT "          Adventure Game"
2590 FOR i=1 TO 8: PRINT : NEXT i
2600 INK 6: PRINT "  Copyright ? G.Ludin
ski 1983";
2610 FOR i=1 TO 3: RANDOMIZE USR 23296:
NEXT i
```

```
2620 RETURN
2670 REM sea subroutine
2680 RESTORE
2690 FOR i=23296 TO 23318
2700 READ a: POKE i,a
2710 NEXT i
2720 RETURN
```

WIRE MAZE



Well at last you have your own robot to cut the grass, clean the car, wash the windows and take the dog for a walk. There is one snag, however.

Your robot has been wired up incorrectly. It must have been Friday afternoon when the other robots put your model together. At the moment, if you press the arm-control button the robot's legs move. You, I'm afraid, are going to have to rewire your new family friend.

How to play

As the program begins, your robot will be drawn on the

screen. When the robot shape is completed, the screen will go black and the wiring will be added along with the control buttons. The robot, complete with wires and buttons will reappear and you will then have to trace the wiring.

Control buttons are:

Red	1
Yellow	2
White	3

At the top of the screen will appear the word Head and the three colour buttons. You must decide which of these buttons is connected to the head and press the corresponding number key and RETURN. One wrong try means you must try again, and a subsequent wrong guess will cause your computer to give you the correct answer. If you think about it, if you have guessed two wrong from three, you should know the answer by now anyway.

You continue for the arms, legs.

To play again, with a different maze, press RUN.

Programming hints

You might find the wire maze too easy. It can be made more difficult by increasing the length of each wire by increasing the larger number in line 420.

Program

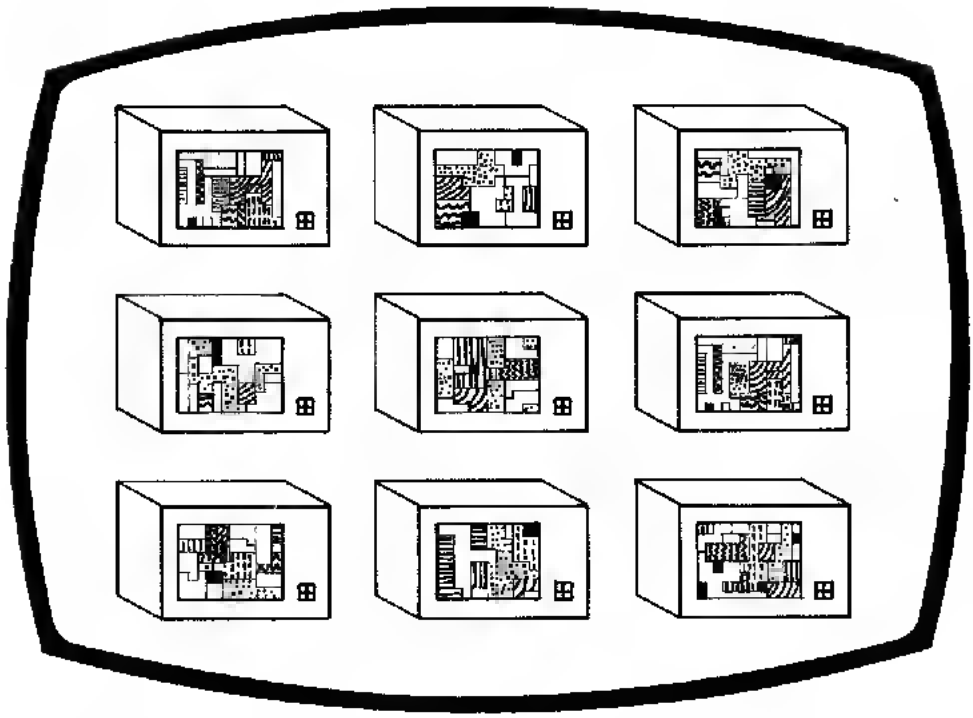
```
10 REM wire maze
20 REM copyright (c) G.Ludinski 1983
```

```
  30 DIM x(3)
  40 DIM y(3)
  50 DIM w(3)
  60 DIM p$(10)
  70 DIM a$(10)
  75 PAPER 7
  80 CLS
  90 REM
 100 REM draw robot
 110 REM
 130 LET a=70: LET b=550: LET c=125: LET
 d=125: GO SUB 680
 140 LET a=0: LET b=500: LET c=275: LET
d=35: GO SUB 680
 150 LET a=0: LET b=350: LET c=35: LET d
=150: GO SUB 680
 160 LET a=240: LET b=350: LET c=39: LET
 d=150: GO SUB 680
 170 LET a=75: LET b=350: LET c=125: LET
 d=150: GO SUB 680
 180 LET a=75: LET b=200: LET c=125: LET
 d=150: GO SUB 680
 190 LET a=35: LET b=150: LET c=200: LET
 d=35: GO SUB 680
 200 INK 2: PAPER 7
 220 REM decide which controls connect t
o which parts
 230 REM
 240 FOR i=1 TO 3
 250 LET w(i)=INT (RND*3+1)
 260 IF (i=2 AND w(i)=w(1)) OR (i=3 AND
(w(i)=w(2) OR w(i)=w(1))) THEN  GO TO 25
0
 270 NEXT i
 280 REM
 290 REM draw wires
 300 REM
 320 LET x(1)=300: LET y(1)=600: PLOT 40
,100: DRAW x(1)/5-40,y(1)/6-100
 330 LET x(2)=300: LET y(2)=400: PLOT 27
5/5,400/6: DRAW x(2)/5-275/5,y(2)/6-400/
6
```

```
 340 LET x(3)=300: LET y(3)=300: PLOT 40
,50: DRAW x(3)/5-40,y(3)/6-50
 350 LET x1=1: LET y1=1
 390 FOR i=1 TO 3
 400 LET x1=x1*-1: LET y1=y1*-1: LET xs=
x1: LET ys=y1
 410 PLOT x(i)/5,y(i)/6
 420 FOR j=1 TO 100
 430 LET dx=xs*INT (RND*30+10)
 440 IF ((x(i)+dx)<300 OR (x(i)+dx)>1200
) THEN  LET xs=-xs: GO TO 430
 450 LET x(i)=x(i)+dx
 460 LET dy=ys*INT (RND*20+10)
 470 IF ((y(i)+dy)<80 OR (y(i)+dy)>960)
THEN  LET ys=-ys: GO TO 460
 480 LET y(i)=y(i)+dy
 490 DRAW dx/5,dy/6
 500 NEXT j
 510 REM
 520 REM draw buttons
 530 REM
 540 LET a=x(i): LET b=y(i): LET c=20: L
ET d=10: GO SUB 680: LET a=x(i)+5: LET b
=y(i)+10: LET c=10: LET d=10: GO SUB 680
 550 PRINT AT INT ((1023-y(i))/46-1),INT
 (x(i)/64)+1;w(i);
 560 NEXT i
 570 REM
 640 REM write questions
 650 REM
 660 FOR i=1 TO 3: GO SUB 730: NEXT i
 670 GO TO 850
 680 REM block sub
 690 LET a=a/5: LET b=b/6: LET c=c/5: LE
T d=d/6
 700 PLOT a,b: DRAW c,0: DRAW 0,d: DRAW
-c,0: DRAW 0,-d
 720 RETURN
 730 REM question sub
 740 IF i=1 THEN  LET p$="HEAD"
 750 IF i=2 THEN  LET p$="ARM "
```

```
 760 IF i=3 THEN  LET p$="LEG "
 770 PRINT AT 2,0;p$;" =";: INK 1: PRINT
 "1";: INK 2: PRINT "2";: INK 3: PRINT "
3";
 780 PRINT AT 4,0;"     ": PRINT "
         "
 790 LET t=1
 800 INPUT a$: IF a$(1)<>"1" AND a$(1)<>
"2" AND a$(1)<>"3" THEN  PRINT AT 4,0;"N
o.";: GO TO 800
 810 IF VAL (a$)=w(i) THEN  PRINT AT 4,0
;"yes           ": GO TO 840
 820 PRINT AT 4,0;"No,try again": IF t=1
 THEN  LET t=2: GO TO 800
 830 IF t=2 THEN  PRINT AT 4,0;"answer =
 ";w(i);"   ":
 835 PAUSE 400
 840 RETURN
```

PATTERN PAIRS



If you have tried Odd One Out in this book, then you will find this following puzzle a little more difficult.

There are nine patterns displayed on the screen, in a range of colours, and you have only a few seconds to compare them and nominate the pair, you believe, are a match.

How to play

Identify your pair, note the numbers alongside and key in your answer. You don't have to key in your answer in strict chronological order. Just punch in your numbers and wait. Correct responses will be awarded with a

pleasant little high pitched tune, but wrong answers will be faced with a low pitched little dirge.

To continue, press Y for Yes and to stop, press N for No, remembering to press RETURN after your response.

A score sheet will appear at the end showing your tries, results, time and average time.

Programming hints

Each of the patterns is slightly different except for the matching pair. This is done by displaying rows of graphic characters with different INK and PAPER colours.

To reduce the time allowed to spot the matching pair reduce the 200 in line 430.

Program

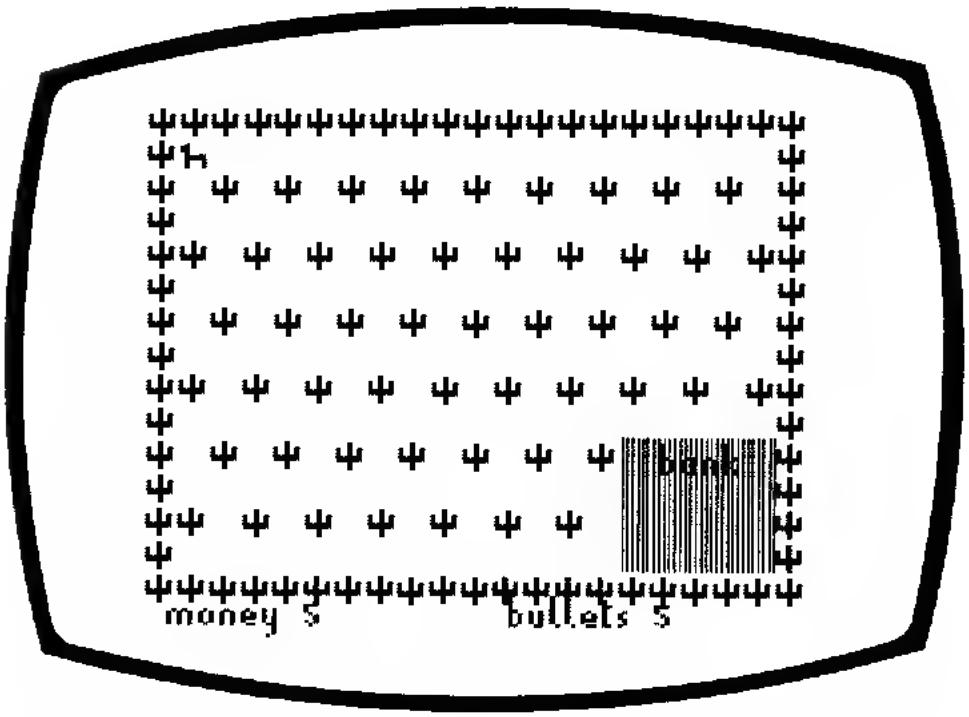
```
  10 REM pattern pairs
  20 REM copyright ? G.Ludinski 1983
  30 BORDER 7: PAPER 7: INK 0
  40 LET testcard=640
  50 DEF FN r(z)=INT (RND*z+1)
  60 DEF FN u()=INT ((65536*PEEK 23674+2
56*PEEK 23673+PEEK 23672)/50)
  70 DEF FN l(m,n)=(m+n+ABS (m-n))/2
  80 DEF FN t()=FN l(FN u(),FN u())
  90 DIM c(2,9): DIM g(16)
 100 POKE 23562,255
 110 LET nu=0: LET cr=0
 120 LET t1=FN t()
 130 CLS
 140 LET nu=nu+1
 150 LET pt=1
 160 REM
```

```
 170 REM draw televisions
 180 REM
 190 LET w=56: LET h=27: FOR y=138 TO 54
 STEP -40: FOR x=10 TO 255 STEP 88
 200 PLOT x,y: DRAW w+10,0: DRAW 0,h: DR
AW -w-10,0: DRAW 0,-h
 210 PLOT x+5,y+5: DRAW w-10-8,0: DRAW 0
,h-10: DRAW -w+18,0: DRAW 0,-h+10
 220 PLOT x,y: DRAW -5,5: DRAW 0,h: DRAW
 5,-5: DRAW -5,5: DRAW w+10,0: DRAW 5,-5
 230 NEXT x
 240 NEXT y
 250 REM
 260 REM generate testcards
 270 REM
 280 LET w1=FN r(9)
 290 LET w2=FN r(9): IF w2=w1 THEN  GO T
O 280
 300 LET w$=STR$ w1+STR$ w2
 310 LET v$=STR$ w2+STR$ w1
 320 LET rd=INT (RND*47+11)
 330 REM
 340 REM draw testcards
 350 REM
 360 GO SUB testcard
 370 REM
 380 REM question
 390 REM
 400 INK 0: PRINT AT 16,0;"      Which tw
o are the same"
 410 LET r$="": LET i=0: LET ic=0
 420 IF INKEY$<>"" THEN  GO TO 420
 430 LET i$=INKEY$: IF (i$="" OR i$<"1"
OR i$>"9") AND i<200 THEN  LET i=i+1: GO
 TO 430
 440 PRINT i$;
 450 IF ic=0 THEN  LET ic=ic+1: LET r$=r
$+i$: GO TO 420
 460 LET r$=r$+i$
 470 IF r$=w$ OR r$=v$ THEN  PRINT : PRI
NT "Yes,you are right": BEEP 2,12: LET c
```

```
r=cr+1: GO TO 490
 480 PRINT : PRINT "No,";w1;" and ";w2;"
 are the same": BEEP 1,5: BEEP .5,4
 490 PRINT : PRINT "Do you want more (Y/
N)"
 500 INPUT r$
 510 IF r$<>"n" AND r$<>"N" THEN  GO TO
130
 520 REM
 530 REM score sheet
 540 REM
 550 CLS
 560 PRINT TAB 10;"Pattern pairs"
 570 FOR i=1 TO 7: PRINT : NEXT i
 580 PRINT : PRINT "Tests completed = ";
nu
 590 LET tm=FN t()-t1
 600 PRINT : PRINT "Tests correct = ";cr
 610 PRINT : PRINT "Time taken = ";tm;"
seconds"
 620 IF cr<>0 THEN  PRINT : PRINT "Time
per test = ";INT (tm/cr);" seconds"
 630 GO TO 800
 640 REM testcard subroutine
 650 FOR q=5 TO 15 STEP 5
 660 FOR k=2 TO 32 STEP 11
 670 PRINT AT q-1,k;pt: INK 2: PAPER 5:
PRINT AT q-2,k+6;"?"
 680 LET cs=pt+rd: LET gs=pt: IF pt=w1 O
R pt=w2 THEN  LET cs=rd: LET gs=0
 690 FOR t=1 TO 2
 700 FOR b=0 TO 3
 710 LET cs=cs+1: IF cs>66 THEN  LET cs=
11
 720 LET gs=gs+1: IF gs>16 THEN  LET gs=
1
 730 INK VAL ((STR$ cs)(1)): PAPER VAL (
(STR$ cs)(2)): PRINT AT q-t-1,k+b;CHR$ (
127+gs)
 740 NEXT b
```

```
750 NEXT t
760 INK 0: PAPER 7: LET pt=pt+1
770 NEXT k
780 NEXT q
790 RETURN
800 REM end
```

WESTERN ADVENTURE GAME



Your rough, tough and ready desperado colleagues have fled into the scrubland, dropping their guns and the loot.

Well we all know that a man, or a Calamity Jane, has got to do what ever it is. So, you are on your own outside the bank and you have to make it to the horses, which some idiot left on the outskirts of town.

On the way you can collect money and guns with bullets and then decide, if you run into the Sheriff's posse, whether to bribe or blast your way to freedom. Obviously your aim is to reach the horses with some bullets and some money.

We are not advocating here that crime pays — that is up to you.

How to play

Use the ARROW keys to make your moves. However you need not press the SHIFT key with the ARROW keys. When you have read each message on the screen press ENTER.

Your footsteps will appear on the screen as you move toward the horse in the top left hand corner of the screen.

Your progress will be recorded on the bottom of the screen, and you will, in your progress, be told that you have run into the posse, and you will then be asked if you intend to shoot or bribe your way out.

Key in 'shoot' or 'bribe' then press the ENTER key.

Should you run out of bullets I'm afraid that a lynching is your fate, as the posse were playing poker when you robbed the bank, and the Sheriff had a Royal Flush.

If you key in an incorrect respone a note is played. This is different to the shooting noise that you hear after you shoot someone or get shot.

Programming hints

You can increase the number of events in the adventure by allowing w on line 440, to be larger.

A subroutine describing the event, and the effect of it, on the money and bullets can be written.

The new subroutines can be called after line 480 and included after any of the subroutines.

Remember that

bu is number of bullets
mo is money
x is the random amount to increase/decrease

Program

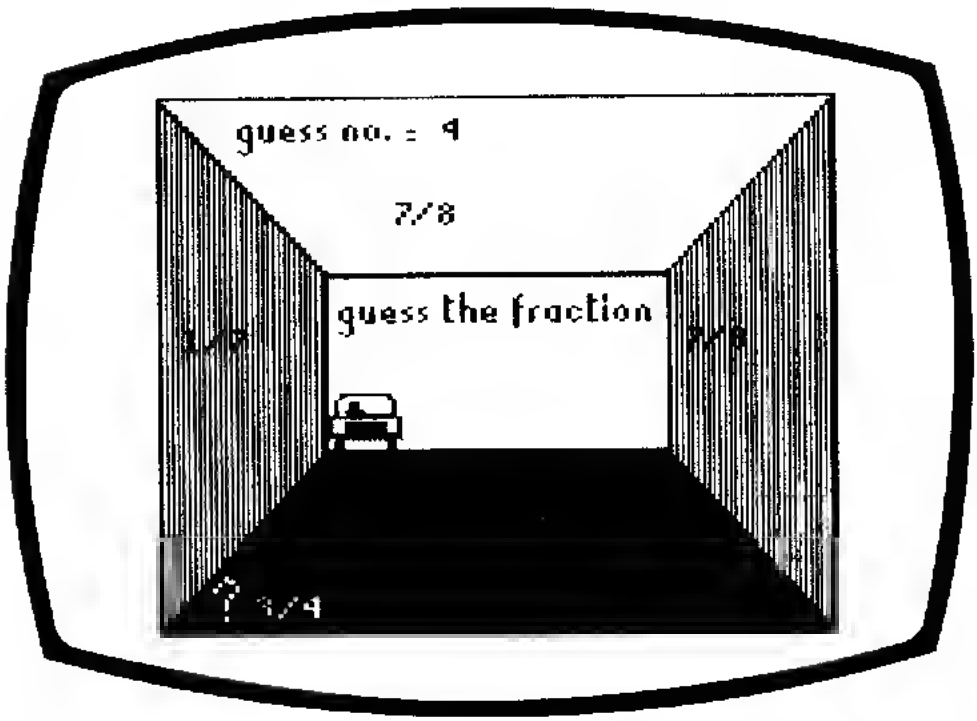
```
  10 REM Western adventure game
  20 REM copyright ? G.Ludinski 1983
  30 BORDER 6: PAPER 6: INK 0
  40 LET x0=25: LET y0=17
  50 LET blank=710: LET posse=510: LET b
ullets=610: LET money=660: LET gunshot=7
40
  60 LET s$="": FOR i=1 TO 96: LET s$=s$
+" ": NEXT i
  70 POKE 23562,255: REM switch off auto
matic key repeat
  80 CLS
  90 REM
 100 REM cactus and horse
 110 REM
 120 FOR n=1 TO 2: READ p$
 130 FOR f=0 TO 7
 140 READ a: POKE USR p$+f,a
 150 NEXT f
 160 NEXT n
 170 DATA "a",BIN 11011011,BIN 11011011,
BIN 11011011,255,255,BIN 00011000,BIN 00
011000,BIN 00011000
 180 DATA "b",0,0,BIN 01100000,BIN 01110
000,BIN 01011111,BIN 00011111,BIN 000100
01,BIN 00010001
```

```
 190 INK 4: FOR i=1 TO 190: PRINT CHR$ 1
44;"  ";: NEXT i
 200 INK 0: PRINT AT 1,1;CHR$ 145
 210 REM
 220 REM gunshot noise
 230 REM
 240 GO SUB gunshot
 250 REM
 260 REM draw bank
 270 REM
 280 PAPER 2: INK 7: PRINT AT 15,27;"
 ": PRINT AT 16,27;"BANK": PRINT AT 17,2
7;"    ": PAPER 6: INK 0
 290 REM
 300 REM
 310 LET bu=5: LET mo=5: LET di=1
 320 GO SUB blank: PRINT AT 19,0;di;") M
oney = ";mo;" Bullets = ";bu
 330 IF bu<=0 THEN  RANDOMIZE USR 32300:
 PRINT "You get shot.You have travelled
";di;" yds.": GO TO 780
 340 IF x0=1 AND y0=1 THEN  GO TO 780
 350 LET x=INT (RND*5+2)
 360 LET t$=INKEY$: IF t$="" THEN  GO TO
 360
 370 IF CODE t$<53 OR CODE t$>56 THEN  B
EEP 1,0: GO TO 360
 380 IF t$="5" AND x0<>0 THEN  LET x0=x0
-1
 390 IF t$="8" AND x0<>31 THEN  LET x0=x
0+1
 400 IF t$="6" AND y0<>17 THEN  LET y0=y
0+1
 410 IF t$="7" AND y0<>0 THEN  LET y0=y0
-1
 420 PRINT AT y0,x0;"?";
 430 LET di=di+1
 440 LET w=INT (RND*4+1)
 450 INK 0
 460 IF w=1 THEN  GO SUB posse
 470 IF w=2 THEN  GO SUB bullets
```

```
 480 IF w=3 THEN  GO SUB money
 490 GO TO 320
 500 REM
 510 REM posse subroutine
 520 PRINT AT 20,0;"You meet one of the
sheriff's   posse. Do you shoot or bribe
 ?";
 530 INPUT i$
 540 IF i$<>"shoot" AND i$<>"bribe" AND
i$<>"SHOOT" AND i$<>"BRIBE" THEN  BEEP 1
,0: GO TO 530
 550 IF (i$="bribe" OR i$="BRIBE") AND m
o<=0 THEN  BEEP 1,0: GO TO 530
 560 IF i$="shoot" OR i$="SHOOT" THEN  R
ANDOMIZE USR 32300: LET bu=bu-x
 570 IF i$="bribe" OR i$="BRIBE" THEN  L
ET mo=mo-x
 580 IF bu<0 THEN  LET bu=0
 590 IF mo<0 THEN  LET mo=0
 600 RETURN
 610 REM bullets subroutine
 620 PRINT AT 20,0;"You find ";x;" bulle
ts that your    gang has left behind-ENT
ER"
 630 LET bu=bu+x
 640 INPUT t$
 650 RETURN
 660 REM money subroutine
 670 PRINT AT 20,0;"You find ";x;" bags
of money that   your gang have left behi
nd-ENTER"
 680 LET mo=mo+x
 690 INPUT t$
 700 RETURN
 710 REM blank subroutine
 720 PRINT AT 19,0;s$;
 730 RETURN
 740 REM gunshot noise subroutine
```

```
 750 FOR i=32300 TO 32318: READ a: POKE
i,a: NEXT i
 760 RETURN
 770 DATA 33,0,10,43,126,246,14,211,254,
6,2,5,32,-3,175,132,200,24,-16
 780 REM end
```

FRACTION CAR CHASE



We might have named this program 'Duel' after the film of the same name as, like the hero of the film, you are being chased by a juggernaut driver.

As you turn right, the juggernaut turns right; turn left and it still follows you.

Coming up in the near distance is an archway. You **must** escape through the arch before the lumbering truck rolls over you.

Your only answer is to work out how far across the road the centre of the arch is. Guess wrongly and you hit the arch damaging your car. Too many wrong guesses and your car will be immobilised leaving you the defenceless victim of the fast approaching juggernaut.

How to play

The computer will think of a number whose numerator (top half) and denominator (bottom half) are both less than ten. You must guess the correct fraction and enter it in using the / symbol (eg 2/3) and RETURN. If your guess is too big, or small, you will be told. The guess closest to the correct answer, will be displayed on the arch. The lower guess will be shown on the left hand pillar and the higher guess, closest to the correct answer, will be shown on the right hand pillar.

If your answer is displayed on the arch then you know that you are almost correct. You have nine lives.

This is more difficult than it sounds, after all do you know which is the larger, 3/8 or 4/9? You will be amazed at what you find out about fractions. A hint is that to make a fraction bigger, increase its numerator (top half) or reduce its denominator (bottom half) or both. Do the opposite to make a fraction smaller.

Programming hints

To make the game easier, reduce the range of fractions allowed. This is done by reducing the tens in line 255. To make it more difficult you may increase these numbers to maximum values of 99 each.

If you want to allow more guesses, increase the 9 in line 300.

Progam

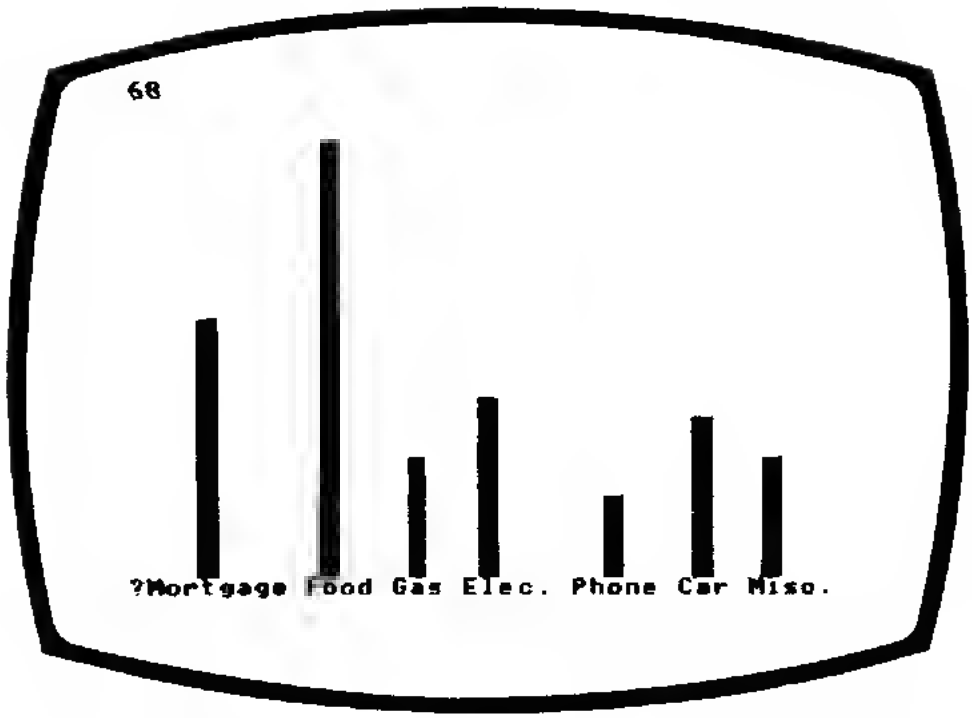
```
10 REM car chase
```

```
  20 REM ?
  30 DEF FN d$(i$,n)=i$( TO n)
  40 DEF FN e$(i$,n)=i$(n TO )
  50 PAPER 6: CLS : GO TO 130
  60 DEF FN b$(n$,n,a)=n$(n TO a)
  70 LET tf=0
  80 FOR l=0 TO 7
  90 LET tf=tf*(2^l)*VAL FN b$(n$,8-l,1)
 100 NEXT l
 110 IF tf=1 THEN  GO TO 120
 130 FOR m=0 TO 7: READ r: POKE USR "p"+
m,r
 140 NEXT m
 145 DATA 0,0,126,66,255,255,255,66
 150 PAPER 6: INK 0: CLS : LET max=10: L
ET min=0: LET a$="?": LET m$="0": LET b$
=" ": LET x$="1": LET z$=" "
 160 REM draw arch
 170 REM
 190 INK 4: LET x=47: FOR y=47 TO 159: L
ET r=40
 200 PLOT x,y: DRAW r,0: NEXT y: IF y=15
9 THEN  GO TO 210
 210 LET x=183: FOR y=47 TO 159: LET r=4
0
 220 PLOT x,y: DRAW r,0: NEXT y: IF y=15
9 THEN  GO TO 230
 230 LET x=87: FOR y=127 TO 159: LET r=9
6
 240 PLOT x,y: DRAW r,0: NEXT y: IF y=15
9 THEN  GO TO 230
 250 REM think of a fraction
 255 LET f=INT (RND*9)+1: LET g=INT (RND
*9)+1
 260 GO SUB 820
 270 IF f/g>1 OR f/g=INT (f/g) OR g/f=IN
T (g/f) THEN  GO TO 255
 280 IF g<f THEN  LET h=g: LET g=f: LET
f=h
 290 PAPER 6: INK 0: PRINT AT 15,16;a$
```

```
 300 FOR t=1 TO 9
 310 REM : PAPER 6: INK 1: PRINT AT 17,0
;TAB 90
 320 PRINT  PAPER 6; INK 0;AT 21,0;"Gues
s the fraction. Use /       "
 330 INPUT i$: IF i$="" THEN  GO TO 330
 340 REM check entry
 345 IF LEN i$<>3 THEN  GO TO 400
 350 FOR i=1 TO 3
 360 LET c$=FN b$(i$,i,i)
 370 IF i=2 AND c$<>"/" THEN  GO TO 400
 375 IF (i=1 OR i=3) AND (CODE c$<49 OR
CODE c$>57 ) THEN  GO TO 400
 380 NEXT i
 390 LET k$=FN d$(i$,1): LET d$=FN e$(i$
,3): GO TO 420
 400 BEEP .3,10: BEEP .5,23: BEEP .7,4:
PRINT AT 21,0;"ERROR, WRONG FORMAT USE "
"a/b""": PAUSE 100: GO TO 320
 420 REM
 430 REM display fraction between arch
 440 REM
 450 INK 0: PRINT AT 8,16;k$: PRINT AT 9
,15;"---";AT 10,16;d$
 460 INK 0: PRINT  PAPER 6; INK 1;AT 0,1
2;"Guess ";t
 470 IF k$=STR$ (f) AND d$=STR$ (g) THEN
  PRINT  INK 0; PAPER 6;AT 1,10;"That's
right": GO SUB 790: GO TO 600
 490 LET v=VAL (i$)
 510 IF v<f/g THEN  PRINT  PAPER 6; INK
1;AT 1,12;"Too small": LET p$=a$: LET o$
=" ": LET u$=" ": GO SUB 790
 520 IF v>f/g THEN  PRINT  PAPER 6; INK
1;AT 1,12;"Too big  ": LET p$=" ": LET o
$=" ": LET u$=a$: GO SUB 790
 530 IF v<max AND v>f/g THEN  LET max=v:
 LET x$=k$: LET z$=d$: GO TO 570
 540 IF v>min AND v<f/g THEN  LET min=v:
 LET m$=k$: LET b$=d$
```

```
 550 INK 0: PAPER 4: PRINT AT 11,8;" ";A
T 11,8;m$
 560 PRINT AT 12,7;"---";AT 13,8;b$: GO
TO 630
 570 PRINT  PAPER 4; INK 0;AT 11,25;x$
 580 PRINT  PAPER 4; INK 0;AT 12,24;"---
";AT 13,25;z$
 590 GO TO 630
 600 PRINT  INK 0; PAPER 6;AT 20,0;TAB 3
2: PRINT AT 21,0;"You escaped - Phew!
          ": GO TO 700
 610 INPUT "Another guess? Y/N";r$
 620 IF r$="n" AND r$="N" THEN  GO TO 68
0
 630 NEXT t
 650 REM
 660 REM end of guesses
 670 REM
 680 PRINT  INK 5; PAPER 1;AT 20,0;TAB 3
2: PRINT AT 21,0;"The juggernaut closes
in         "
 690 PRINT "The fraction is  ";f;"/";g;"
            "
 700 INPUT "Do you want more? Y/N";r$
 710 IF r$<>"n" AND r$<>"N" THEN  GO TO
140
 720 GO TO 870
 730 STOP
 790 REM car
 800 PRINT  INK 6; PAPER 4;AT 15,8;p$: P
RINT  PAPER 6;AT 15,16;o$;: PRINT  INK 6
; PAPER 4;AT 15,25;u$
 810 RETURN
 820 REM reduce
 830 FOR i=2 TO 9
 840 IF f/i=INT (f/i) AND g/i=INT (g/i)
THEN  LET f=f/i: LET g=g/i: GO TO 840
 850 NEXT i
 860 RETURN
 870 STOP
```

BAR CHARTER



This is a versatile program that will enable you to record your expenses, club accounts or any collections you have. You could also use the printouts to impress the boss. It is easy to use and allows a maximum of 32 bars to be drawn. As you key in data you watch the bar chart grow. After you have done this, you have have an option of printing out the bar chart on your printer or saving as SCREEN$.

How to use it

First you are asked for the labels of the bars in the bar chart. There may be any number but all the labels must fit

on one display line. When you have keyed in a line of labels press RETURN once. Then you use the left and right ARROW keys to move a pointer at the bottom of the screen. When the pointer (symbol ↑ is positioned under the label you wish to point to, press 7 and the bar above that label will increase in height. Press ↓ and the bar will decrease in height. Press 'K' to save the charts as a SCREEN$. Press 'Z' to copy the screen via the printer and press 'H' to give height of column marked with arrow. Remember to use Caps. Shift.

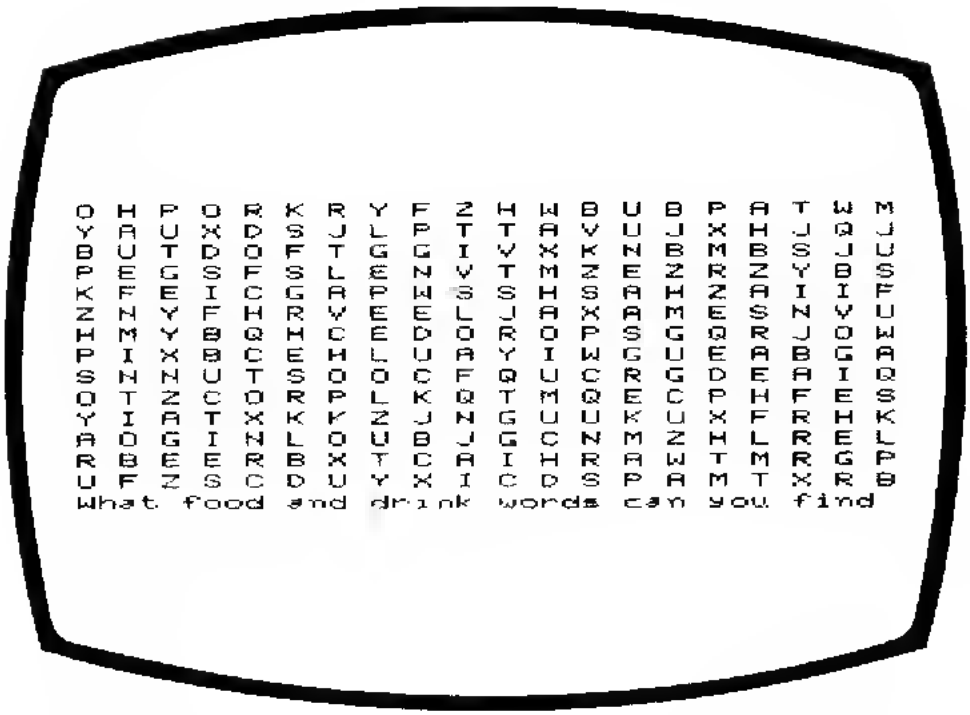
Program

```
  10 REM
  20 REM ?
  30 REM
  40 BORDER 6: PAPER 6: INK 1: CLS
  42 DIM Y(32): DIM A$(31)
  45 LET X=16: FOR F=1 TO 19: LET Y(F)=0
: NEXT F
  50 REM
  60 REM INPUT LABELS
  70 REM
  80 INPUT "WHAT ARE THE LABELS?
    ";A$
 100 PRINT AT 20,1;A$
 112 PRINT AT 21,X;"^"
 115 FOR F=0 TO 19: PRINT AT F,0;"-": NE
XT F
 120 REM KEY IN DATA
 130 REM
 135 PAUSE 25
 140 LET B$=INKEY$: IF B$="" THEN  GO TO
 140
 150 IF CODE B$=53 OR CODE B$=56 THEN  G
O SUB 500: GO TO 120
 160 IF CODE B$<>55 THEN  GO TO 180
 165 LET Y(X)=Y(X)+1: IF Y(X)>19 THEN  L.
```

```
ET Y(X)=Y(X)-1: PRINT AT 21,0; OVER 1;"C
OLUMN TOO HIGH ": PAUSE 90: PAUSE 10: GO
 TO 120
 170 GO SUB 600: GO TO 120
 180 IF CODE B$<>54 THEN  GO TO 210
 190 LET Y(X)=Y(X)-1: IF Y(X)<0 THEN  LE
T Y(X)=Y(X)+1: GO TO 120
 200 GO SUB 600: GO TO 120
 210 IF CODE B$=90 THEN  COPY : GO TO 12
0
 220 IF CODE B$=72 THEN  GO SUB 700: GO
TO 120
 230 IF CODE B$=75 THEN  INPUT "INPUT NA
ME;";C$: SAVE C$SCREEN$ : GO TO 120
 240 GO TO 120
 497 REM
 498 REM MOVE ARROW
 499 REM
 500 IF CODE B$=53 AND X=1 THEN  RETURN
 510 IF CODE B$=56 AND X=31 THEN  RETURN
 520 IF CODE B$=53 THEN  LET X=X-1
 530 IF CODE B$=56 THEN  LET X=X+1
 540 PRINT AT 21,0;,,
 550 PRINT AT 21,X; FLASH 1;"^"
 555 PAUSE 10: PAUSE 10
 560 RETURN
 600 REM
 610 REM DRAW COLUMN
 620 REM
 630 FOR F=19 TO 20-Y(X) STEP -1: PRINT
AT F,X;"?": NEXT F
 640 FOR F=(19-Y(X)) TO 0 STEP -1: PRINT
 AT F,X;" ": NEXT F: RETURN
 650 PRINT AT E,X;"U"
 660 NEXT E
 670 RETURN
 700 REM
 710 REM GIVE COLUMN HEIGHT
 720 REM
```

```
 730 PRINT AT 21,0;"HEIGHT OF """;A$(X);
"""=";Y(X);" UNITS (HIT ""C"")"
 740 PAUSE 0: RETURN
```

WORD SEARCH



This is a brainteaser you have probably come across in puzzle magazines, but that doesn't make it any easier.

The words which are hidden in the screen spaghetti are all four letter — related to food or drink.

How to play

When you have found one of the twenty words on the screen, key it in and press RETURN.

If your guess is correct your word will be ticked, if wrong it will be crossed. Your score will be displayed at the top.

To change the screen key in NEXT and press RETURN.

Programming hints

Two methods are used to reduce the memory required in this program. First, all the numerical arrays are integer arrays. Secondly the possible words are stored one after another in a string, instead of an array.

Another change that you could make is to alter the words that can be found. There are 57 of them in order to make the puzzles as random as possible. These words are stored in the variable W$ on line 70. If you think of other four-letter words to do with food and drink, then just replace some of the words with those you have chosen. If you want to put in words on a different subject, then think of a subject and replace words in W$ with your words all joined together. Remember there must be 57 of them, and they must all have four letters.

If you wish to use longer or shorter words, all words must still be of the same length as each other. Change the words in W$ so the total number of letters is still the same. Then change ID in line 240 so 4 is replaced by the number of letters in each word, and 57 is replaced by the maximum number of words in W$. The minimum value of ID must be 1 so 3 should be changed accordingly. The 3 in line 280 should also be changed. If the word length is increased more elements of array L$ must be checked to be empty and then assigned a letter in lines 290 to 310. Also the 80 (which is 20 words of 4 letters) and 4 in line 520 should be changed. The 3 in line 530, and the 3 and 4 in line 570 should also be changed.

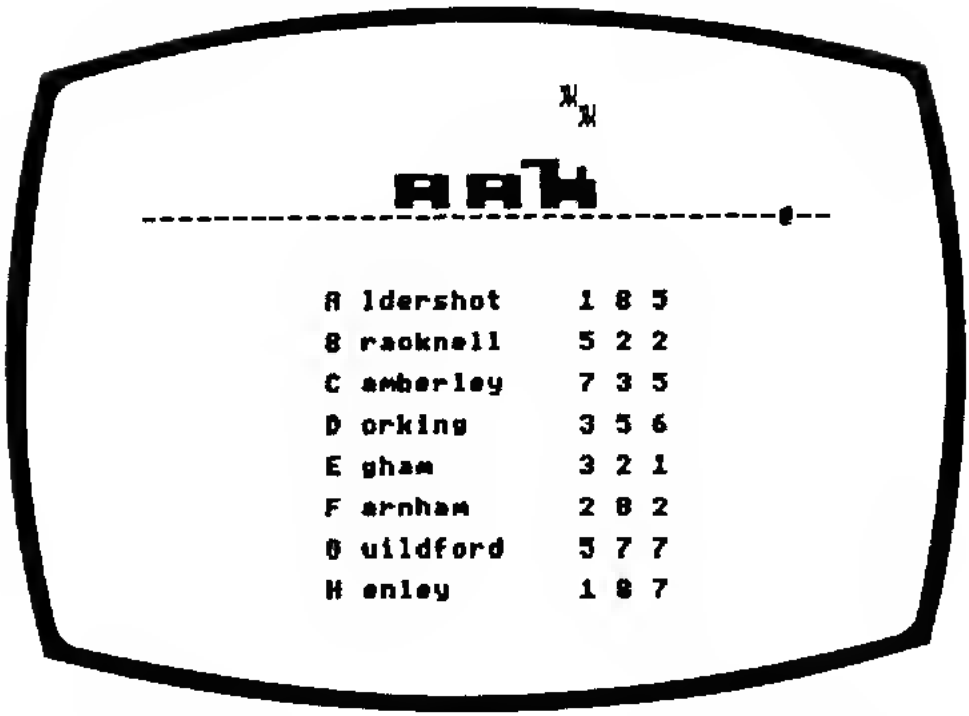
Program

```
  10 REM WORD SEARCH
  20 REM COPYRIGHT (C) G.LUDINSKI 1983
  30 CLS
  40 DIM L$(24,18): DIM C$(20,14)
  50 DIM E$(80): DIM D$(4)
  60 DIM P$(20)
  70 LET W$="FISHMEATCAKESOUPPEASSALTCHO
PCORNWINEBEERLIMEBRANBEANVEALROLLHAKEPIK
EROCKSPAMMALTROLLMINTLAMBPORKBEEFTARTCAN
ENUTSTUNARICESAKISAGOLOAFGAMEHERBPEARMIL
KLARDCHIPSTEWOATSPATESAGEMACECRABMASHCOL
APITHPEELSOYALEEKDUCKDILLYOLKBALMSUETSOD
A"
  80 LET P$(1)=CHR$ (240)
  90 REM
 100 REM GENERATE LETTERS
 110 REM
 120 CLS
 130 LET E$="": LET CR=0
 140 FOR I=1 TO 14
 150 FOR J=1 TO 20
 160 LET L$(J,I)=" "
 170 LET C$(J,I)=CHR$ (0)
 180 NEXT J
 190 NEXT I
 200 FOR I=1 TO 20
 210 LET D=INT (RND*3+1)
 220 LET R=INT (RND*10+1): IF D=2 THEN
LET R=INT (RND*14+1)
 230 LET C=INT (RND*16+1): IF D=1 THEN
LET C=INT (RND*20+1)
 240 LET ID=4*INT (RND*57)+1
 250 FOR Q=0 TO I-1: IF ID=CODE (P$(Q+1)
) THEN  GO TO 240
 260 NEXT Q
 270 LET P$(I)=CHR$ (ID)
 280 LET D$=W$(ID TO ID+3)
 290 IF D=1 AND L$(C,R)=" " AND L$(C,R+1
```

```
)=" " AND L$(C,R+2)=" " AND L$(C,R+3)="
" THEN  FOR K=0 TO 3: LET L$(C,R+K)=D$(K
+1): LET C$(C,R+K)=CHR$ (I): NEXT K: GO
TO 330
 300 IF D=2 AND L$(C,R)=" " AND L$(C+1,R
)=" " AND L$(C+2,R)=" " AND L$(C+3,R)="
" THEN  FOR K=0 TO 3: LET L$(C+K,R)=D$(K
+1): LET C$(C+K,R)=CHR$ (I): NEXT K: GO
TO 330
 310 IF D=3 AND L$(C,R)=" " AND L$(C+1,R
+1)=" " AND L$(C+2,R+2)=" " AND L$(C+3,R
+3)=" " THEN  FOR K=0 TO 3: LET L$(C+K,R
+K)=D$(K+1): LET C$(C+K,R+K)=CHR$ (I): N
EXT K: GO TO 330
 320 GO TO 210
 330 LET E$(I*4-3 TO I*4)=D$
 340 NEXT I
 350 REM
 360 REM DISPLAY LETTERS
 370 REM
 380 FOR I=1 TO 14
 390 FOR J=1 TO 20
 400 IF L$(J,I)=" " THEN  PRINT AT I,J;C
HR$ (65+INT (RND*26));: GO TO 420
 410 PRINT AT I,J;L$(J,I);
 420 NEXT J
 430 NEXT I
 440 REM
 450 REM CHECK ANSWER
 460 REM
 470 FOR N=1 TO 20
 480 PRINT AT 19,0;"WHAT FOOD AND DRINK
WORDS CAN   YOU FIND"
 500 INPUT I$
 505 PRINT AT 19,0;"
                    "
 510 IF I$="NEXT" THEN  GO TO 120
 520 FOR M=1 TO 77 STEP 4
 530 IF I$<>E$(M TO M+3) THEN  GO TO 610
 540 PRINT AT 10,23;"CORRECT";AT 12,25;I
```

```
$;: LET CR=OR+1: PRINT AT 5,23;"SCORE:";
CR;
 550 FOR I=1 TO 14
 560 FOR J=1 TO 20
 570 IF C$(J,I)=CHR$ ((M+3)/4) THEN  PRI
NT AT I,J;" ";
 580 NEXT J
 590 NEXT I
 595 LET E$(M TO M+3)="     "
 600 GO TO 630
 610 NEXT M
 620 PRINT AT 10,23;"WRONG  ";AT 12,25;"
    ";
 625 GO TO 480
 630 NEXT N
 640 STOP
```

DECISIVE HERO



The wicked Baron has captured your love, Loretta, and tied her to the railroad track. Only you can save her from a grisly fate, but you will have to think fast and act even quicker. Wherever the Baron has taken her, you can be sure it will be in a town far away from you, and you must work out the three possibilities, key in your answers and stop the train.

Please act quickly, as the thought of losing Loretta is too terrible to contemplate.

How to play

The names of eight towns will be displayed on the screen

with letters A to H. Against each of the letters you will be shown a combination of numbers.

You must decide which three series of numbers are the highest, type them in and stop the train.

Example: from the screen shown above you will see that the correct answer is c, g and h. You don't have to key in your answers in alphabetical order, just key them in correctly and quickly. If you stop the train or, unfortunately for Loretta, the train reaches the end of the screen, you will be asked if you wish to continue or end the program.

Press c and ENTER to continue, or e and ENTER to end the game.

Skill rating

When the game ends, a score sheet will be displayed showing your total, giving a qualitative rating and an IQ level of your decisiveness. This is not a true IQ level as intelligence is made up of reasoning ability, memory etc. but this result will be an indication of your IQ decisiveness level.

Classifications below Fair are omitted, as I know that if you are using this book you are above average!

Programming hints

If you wish to increase the time allowed to guess the answers then increase the distance the smoke travels. To do this increase the 3 in line 960 to a maximum of 12.

After thinking about this, you may decide to **reduce** the distance travelled by the smoke and thereby decrease your thinking time.

Program

```
 10 REM Decisive hero
 20 REM Copyright ? G.Ludinski 1983
 30 DIM a$(3,12): DIM x(12): DIM y(12):
DIM n(3,8): DIM s(8): DIM t$(8,10): DIM
t(8): DIM w(50)
 40 POKE 23658,0
 50 LET shapes=1190: LET train=840: LET
smoke=810: LET iq=1050
 60 CLS
 70 LET s$="
    "
 80 REM
 90 REM store town names and trin shape
100 REM
110 GO SUB shapes
120 FOR i=1 TO 8: READ t$(i): NEXT i
130 LET a$(1)=" ??? ??? "+CHR$ 160+CHR$
162+"?"
140 LET a$(2)=" ??? ??? "+CHR$ 144+CHR$
147+"?"
150 LET a$(3)=" ???-???-???"
160 REM
170 REM store positions of smoke
180 REM
190 FOR i=1 TO 2
200 LET x(i)=12-i
210 LET y(i)=2-i
220 NEXT i
230 FOR i=3 TO 12
240 LET y(i)=2
250 LET x(i)=13-i
260 NEXT i
270 LET te=0: LET er=0: LET cr=0
```

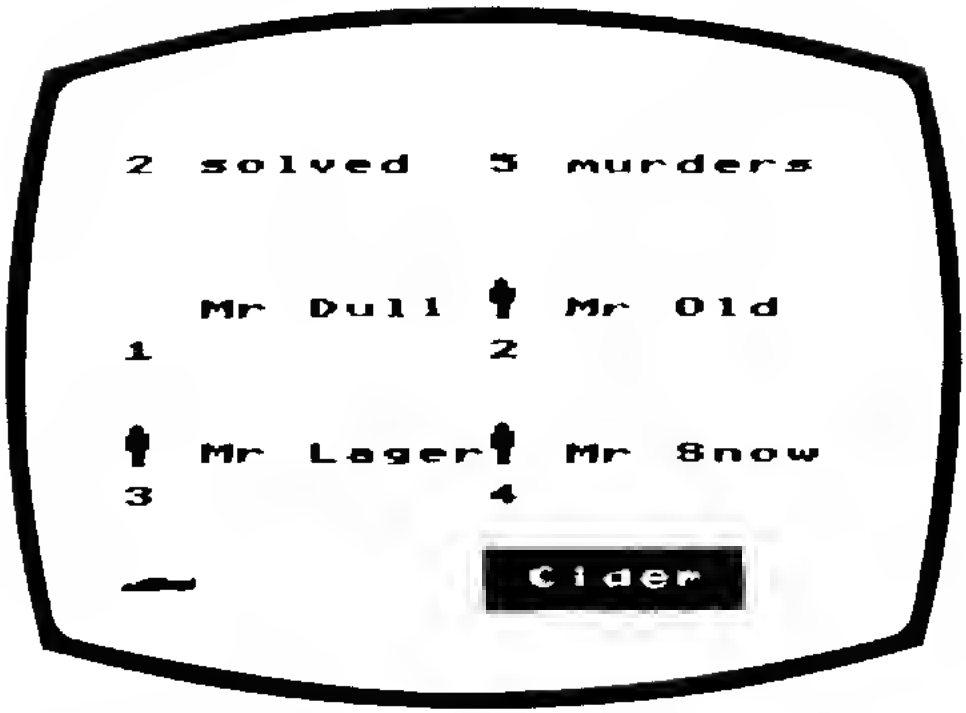
```
 280 REM
 290 REM the action starts here
 300 REM
 310 CLS
 320 LET te=te+1
 330 REM
 340 REM store lists of numbers and thei
r sum
 350 REM
 360 FOR k=1 TO 7: LET s(k)=0: NEXT k
 370 FOR j=1 TO 8
 380 FOR i=1 TO 3
 390 LET n(i,j)=INT (RND*9+1)
 400 LET s(j)=s(j)+n(i,j)
 410 NEXT i
 420 NEXT j
 430 FOR i=1 TO 8: LET t(i)=i: NEXT i
 440 REM
 450 REM bubble sort of the sums of each
 list
 460 REM
 470 FOR j=1 TO 7
 480 FOR i=1 TO 7
 490 IF s(i)<s(i+1) THEN  LET tp=s(i): L
ET s(i)=s(i+1): LET s(i+1)=tp: LET tp=t(
i): LET t(i)=t(i+1): LET t(i+1)=tp
 500 NEXT i
 510 NEXT j
 520 REM
 530 REM check for any duplicates
 540 REM
 550 LET twn=3: FOR i=4 TO 8
 560 IF s(i)=s(1) OR s(i)=s(2) OR s(i)=s
(3) THEN  LET twn=i
 570 NEXT i
 580 REM
 590 REM display problem
 600 REM
 610 PRINT : PRINT : PRINT : PRINT : PRI
NT : PRINT
```

```
 620 PRINT "_____
_";: INK 6: PRINT "?";: INK 0: PRINT "_"
 630 PRINT : PRINT : PRINT
 640 FOR j=1 TO 8
 650 PRINT s$( TO 6);t$(j)(1);" ";t$(j)(
2 TO );"    ";
 660 FOR i=1 TO 3
 670 PRINT STR$ (n(i,j));" ";
 680 NEXT i
 690 PRINT
 700 NEXT j
 710 PRINT
 720 LET cr1=0: LET ix=0: LET w(1)=0: LE
T w(2)=0: LET w(3)=0
 730 PRINT AT 0,0;: GO SUB train
 740 BEEP 2,-4: BEEP 1,-10
 750 FOR h=1 TO 10: LET z$=INKEY$: NEXT
h
 760 PRINT AT 21,0;"Press c to continue
or e to end": INPUT c$
 770 IF c$="c" THEN  GO TO 310
 780 GO SUB iq
 790 GO TO 1450
 800 REM
 810 REM smoke subroutine
 820 PRINT AT y(i),x(i)+1;CHR$ 149;
 830 RETURN
 040 REM train subroutine
 850 BEEP 0.5,36.5: BEEP 0,0: BEEP 1,36.
5
 860 FOR l=1 TO 18
 870 LET i$=INKEY$
 880 IF i$="" THEN  GO TO 930
 890 FOR j=1 TO twn
 900 IF i$=CHR$ (96+t(j)) AND  i$<>CHR$
(w(1)+96) AND i$<>CHR$ (96+w(2)) AND i$<
>CHR$ (96+w(3)) THEN  LET cr1=cr1+1: LET
 ix=ix+1: LET w(ix)=t(j): BEEP .2,13: GO
 TO 930
 910 NEXT j
 920 LET er=er+1
```

```
 930 IF cr1=3 THEN  LET cr=cr+1: GO TO 1
040
 940 INK 1: PRINT AT 3,1;a$(1);AT 4,1;a$
(2);AT 5,1;a$(3)
 950 LET i=1: INK 0: GO SUB smoke
 960 FOR i=2 TO 3
 970 INK 0: GO SUB smoke
 980 LET i=i-1: INK 7: GO SUB smoke
 990 LET i=i+1: INK 0: GO SUB smoke
1000 NEXT i
1010 LET i=i-1: INK 7: GO SUB smoke: INK
 0
1020 NEXT 1
1030 BEEP 0.5,36.5: BEEP 0,0: BEEP 1,36.
5
1040 RETURN
1050 REM IQ subroutine
1060 CLS
1070 PRINT : PRINT "Number of tests comp
leted = ";te
1080 PRINT : PRINT "Number of tests corr
ect = ";cr
1090 PRINT : PRINT "Number of incorrect
answers = ";er
1100 LET sc=INT (((er*3)+((te-cr)*10))/t
e)
1110 PRINT
1120 IF sc<5 THEN  PRINT "This is classe
d as SUPERIOR      (upper 10%)": GO TO 11
50
1130 IF sc<7 THEN  PRINT "This is classe
d as GOOD (upper  30%)": GO TO 1150
1140 IF sc<9 THEN  PRINT "This classed a
s FAIR (upper 60%)"
1150 IF sc=0 THEN  LET iqu=150: GO TO 11
70
1160 LET iqu=INT (760/sc): IF iqu>150 TH
EN  LET iqu=150
1170 PRINT : PRINT "Your I.Q. level (dec
isiveness) =";iqu
```

```
1180 RETURN
1190 REM shapes subroutine
1200 RESTORE
1210 REM  DATA 255,129,129,129,129,129,1
29,255
1220 LET en=BIN 01000010: LET gn=BIN 111
11111: LET e1=BIN 00001100: LET e2=BIN 0
0110000
1230 DATA 0,0,gn,gn,e1,e1,e1,e1
1240 FOR i=0 TO 7
1250 READ row: POKE USR "Q"+i,row
1260 NEXT i
1270 DATA e1,e1,e1,e1,gn,gn,gn,gn
1280 FOR i=0 TO 7
1290 READ row: POKE USR "A"+i,row
1300 NEXT i
1310 DATA 0,0,BIN 11110000,BIN 11110000,
e2,e2,e2,e2
1320 FOR i=0 TO 7
1330 READ row: POKE USR "S"+i,row
1340 NEXT i
1350 DATA e2,e2,e2,e2,gn,gn,gn,gn
1360 FOR i=0 TO 7
1370 READ row: POKE USR "D"+i,row
1380 NEXT i
1390  DATA BIN 01111110,gn,gn,gn,gn,gn,g
n,BIN 01111110
1400 FOR i=0 TO 7
1410 READ row: POKE USR "F"+i,row
1420 NEXT i
1430 RETURN
1440 DATA "Aldershot ","Bracknell ","Cam
berley ","Dorking   ","Egham     ","Farn
ham   ","Guildford ","Henley    "
1450 REM end
```

WHO DUNNIT



Looking through the window you see him standing in his study. Then you hear a gun shot and he falls to the ground. You walk into the house and go into his study.

There are four men there. You know their names. You find a note which he must have written before he died. This is a clue to the murderer. You must decide which of the four men is the murderer before they slip out the room.

How to play

The victim's note is by the man lying down. You must work out which of the names of the other men has some connection with this word. For example, in the screen

shown above, Mr Lager is the murderer as Lager and Cider are both drinks. Alternatively words that are related may have the same or opposite meanings. For example, Big and Large, also Hot and Cold are related.

Key in the number below the suspected murderer, (3 in this case) before the four men disappear off the screen.

If you are right, you hear police sirens as the police cars approach. If you are wrong or too late, you do not. The score is given on the top line. Press RETURN to play again.

Programming hints

If you want to add more words to the game, add some more DATA statements at the end of the program. Put in sets of three words that are related. Read the other words in lines 740 to 760 for ideas. Make sure that each set is not related to the other words in those lines. When you have added the extra words, count up the total number of sets of words from line 740 and assign it to TT in line 310.

Program

```
  10 REM WHODUNNIT
  20 REM COPYRIGHT (C) G.LUDINSKI 1983
  30 CLS
  40 DIM W$(30,3,10): DIM N(5): DIM X(4)
: DIM Y(4): DIM P$(2,10): DIM Q$(2,10)
  45 DIM v$(5)
  47 DIM T$(20): DIM Z$(20)
  48 DIM U$(20)
  50 LET X(1)=0: LET Y(1)=7: LET X(2)=10
: LET Y(2)=7: LET X(3)=0: LET Y(3)=14: L
ET X(4)=10: LET Y(4)=14
  60 LET SC=0: LET TU=0
  70 GO TO 200
```

```
 180 REM SHAPES OF MEN
 190 REM
 200 RESTORE 900
 210 FOR N=0 TO 7: READ D: POKE USR "a"+
n,D: NEXT n
 220 FOR n=0 TO 7: READ d: POKE USR "b"+
n,d: NEXT n
 230 FOR n=0 TO 7: READ d: POKE USR "c"+
n,d: NEXT n
 240 FOR n=0 TO 7: READ d: POKE USR "d"+
n,d: NEXT n
 250 LET v$=CHR$ 146+CHR$ 147
 260 LET bl=0: LET rd=1: LET ye=2: LET w
h=3
 270 PAPER bl: INK wh
 280 REM
 290 REM Read words
 291 RESTORE
 300 REM
 310 LET tt=25
 320 FOR J=1 TO TT
 330 READ T$: LET W$(J,1)=T$: READ T$: L
ET W$(J,2)=T$: READ T$: LET W$(J,3)=T$
 340 NEXT J
 360 REM
 370 REM UPRIGHT MAN AND GUN SHOT
 380 REM
 390 CLS : PAPER BL: INK WH: PRINT AT 20
,0;CHR$ 144;AT 21,0;CHR$ 145
 410 REM
 420 FOR I=1 TO 4
 430 LET N(I)=INT (RND*TT)+1
 440 NEXT I
 450 IF N(1)=N(2) OR N(1)=N(3) OR N(1)=N
(4) OR N(2)=N(3) OR N(2)=N(4) OR N(3)=N(
4) THEN  GO TO 390
 460 REM
 470 REM DRAW PEOPLE AND NAMES
 480 REM
 490 LET TU=TU+1
 500 LET SN=INT (RND*4+1)
 510 FOR I=1 TO 2
```

```
 520 LET P$(I)=W$(N((2*I)-1),INT (RND*3)
+1): LET Q$(I)=W$(N(2*I),INT (RND*3+1))
 530 INK WH: PRINT AT 7*I,0;CHR$ 144;AT
7*i+1,0;CHR$ 145;: INK YE: PRINT " MR ";
P$(I);: INK WH: PRINT AT 7*I,10;CHR$ 144
;AT 7*i+1,10;CHR$ 145;: INK YE: PRINT "
MR ";Q$(I)
 540 PRINT AT (7*I)+3,0;2*I-1;AT (7*I)+3
,10;2*I
 550 NEXT I
 560 LET Z$=W$(N(SN),INT (RND*3+1)): IF
Z$=P$(1) OR Z$=P$(2) OR Z$=Q$(1) OR Z$=Q
$(2) THEN  GO TO 560
 570 LET U$=" "+Z$+" "
 580 PRINT AT 21,0;" ";
 590 INK WH: PRINT AT 20,0;V$;: PAPER WH
: INK WH: PRINT AT 19,10;U$;: INK RD: PR
INT AT 20,10;U$;: INK WH: PRINT AT 21,10
;U$: PAPER BL
 600 LET K=1
 610 LET f=0
 611 LET i$=INKEY$: IF i$>="1" AND i$<="
4" THEN  GO TO 620
 612 LET f=f+1: IF f<>40 THEN  GO TO 611
 615 PRINT AT y(k),x(k);" ";AT y(k)+1,x(
k);" "
 618 LET k=k+1: LET i$="0": IF k<5 THEN
 GO TO 610
 620 REM
 630 REM POLICE SIREN
 640 REM
 650 IF VAL (I$)=SN THEN  FOR K=1 TO 4:
BEEP .5,11: BEEP .5,7: NEXT K: LET SC=SC
+1
 660 REM
 670 REM SCORE
 680 REM
 690 INK WH: PRINT AT 1,0;SC;" SOLVED ";
TU;: IF TU>1 THEN  PRINT " MURDERS": GO
TO 700
```

```
 695 PRINT " MURDER"
 700 INK WH: PRINT AT 2,0;"PRESS ENTER":
 INPUT R$: GO TO 390
 710 REM
 720 REM DATA
 730 REM
 740 DATA "BIG","SMALL","LARGE","FAT","T
HIN","PLUMP","QUIET","LOUD","NOISY","WET
","DRY","DAMP"
 750 DATA "HOT","COLD","WARM","A","Z","A
LPHA","GOOD","BAD","NICE","MAD","CRAZY",
"SANE","DULL","SHINY","MATT","SEE","HEAR
","FEEL","OLD","YOUNG","AGED","LAUGH","C
RY","WEEP","KID","CHILD","ADULT","AM","P
M","NOON","BIRD","FOWL","BEAST","SNOW","
ICE","SLEET","BEER","LAGER","CIDER"
 760 DATA "KING","QUEEN","JACK","GIVE","
TAKE","GRASP","BBC","ITV","CH4","ILL","W
ELL","SICK","GYM","PT","PE","RED","AMBER
","GREEN","LOAD","SAVE","RUN","EYE","I",
"AYE"
 900 DATA BIN 00010000,BIN 00111000,BIN
00111000,BIN 00010000,BIN 01111100,BIN 0
1111100,BIN 01111100,BIN 01111100
 910 DATA BIN 01111100,BIN 01111100,BIN
00111000,BIN 00111000,BIN 00111000,BIN 0
0111000,BIN 00111000,BIN 00111000
 920 DATA 0,0,0,0,BIN 00001111,BIN 01011
111,255,255
 930 DATA 0,0,0,0,BIN 11000001,255,255,2
55
```